

Railway Age

Vol. 78, No. 30

June 27, 1925

Table of Contents Appears on
Page 5 of Advertising Section

Hot Boxes and Train Delays

IN recent months the railways have made increasingly good records of mileage per train delay, a fact which speaks well for the present general standards of maintenance of both cars and locomotives and in particular for the attention given to journal bearing conditions and lubrication. Hot boxes are the "bugbear" of railway operating and mechanical men on a road which sees in reduced train delays an opportunity to save money and increase its prestige and popularity. The best journal which a skilled mechanic can turn out on a properly-conditioned journal lathe is none too good to carry 17,000 lb. load (more or less) on its brass at speeds up to 60 or 70 miles an hour without heating. Many a journal, accurately machined, has been ruined by subsequent rough handling, exposure unprotected to the weather, or handling with a gritty wheel stick. One should as soon expect a car man with dirty hands to repair a triple valve as to assemble a journal and brass without due precautions to see that *no foreign substance* gets into the bearing. A continuous campaign is needed against careless workmanship in maintaining car journal bearings. It is also important that sufficient time be allowed for thorough inspection at terminals. One close student of railway lubricating methods says that he timed packers working in a freight yard on a 50-car "high-ball" stock train and found that they averaged seven seconds per box. Whether this is adequate for a detection of boxes likely to give subsequent trouble may well be doubted. Every journal which shows the least sign of heating has some trouble which should be corrected *on the spot*. At the next terminal, it may be too late. Many train delays can be prevented by discouraging over-zealous operating men and trainmen from passing such cars in the hope that they will proceed to the next terminal without having to be cut out.

Crow's Nest Agreement Discarded

THE Crow's Nest Agreement which has kept the freight rate situation in Canada completely muddled for over a year has again gone into the discard this time apparently for some time to come. This agreement, which was suspended shortly after the war, provided for low maximum rates in the Prairie provinces on the lines of the Canadian Pacific which were in operation in 1897. The agreement came into operation in July of last year by default, the government having failed to renew the order in council against its reintroduction. Immediately the rate situation became confused. The Canadian National, of course, applied the ruinously low Crow's Nest rates only at competitive points and the Canadian Pacific did not apply them on lines built since 1897, when the agreement was entered into. After a few months the Board of Railway Commissioners of Canada, which exercises much the same authority as the Interstate Commerce Commission south of the border, sus-

pended the rates on account of the gross discriminations resulting from them. The suspension was carried to the Canadian Supreme Court, but before the court presented its decision, which was adverse to the suspension, the government had already gone over the heads of the Railway Board and restored the rates. Parliament has now passed a law directing the Railway Board to fix just and reasonable rates regardless of the Crow's Nest Agreement—except that the Crow's Nest maximum must be kept on grain and flour. This restriction cannot of course be defended from an economic standpoint. There is no more reason why the board should be forbidden to establish scientific rates on grain than there is why it should be forbidden to establish them on pulpwood or any other basic Canadian commodity. The Conservative contingent in Parliament favored leaving the whole rate question to the expert action of the Railway Board. However, those sections of the country which benefited from the Crow's Nest rates were quite desirous of retaining them, so the present law really is a compromise between the two points of view. However unjustified economically, it is, perhaps, necessary from a political standpoint. And at any rate it provides some kind of a basis for establishing rates which, whatever its faults, is at any rate a great improvement over the condition which has prevailed for the past year.

Foremanship Training

ONE of the most important developments in the industrial world in recent years has been the growing realization that management of a business or organization is a profession and is based on sound, scientific principles. Not a few colleges now offer courses in business management and several of the engineering departments in universities require the students to take a short course in management. Some national societies, such as the American Society of Mechanical Engineers, have management divisions, and organizations such as the Taylor Society and the American Management Association specialize in this field. The latter association has several well organized divisions, including one for financial executives and others for office executives, production executives and sales executives. Railroad officers have been following this development more or less closely, although in general not nearly so much so as many of the larger and more progressive industries. A study made by the Railway Mechanical Engineer and reported in its June issue, indicates that several of the railroad mechanical departments have provided or helped to organize various methods of training the foremen and supervisory officers in the art of leadership. One great difficulty has been to develop the right sort of programs and supply the kind of leadership that is necessary successfully to carry on training courses or educational work of this sort. The State of New York, through the State Department of Education at Albany, is offering a six-weeks summer course at the State Normal School, Oswego,

N. Y., July 6-August 14, for the training of foremen to act as conference leaders. Splendid results have been obtained in some industries by organizing systematic foreman training conferences, but the great difficulty has been to obtain leaders capable of directing them. "The training of foremen," states the prospectus, "cannot be satisfactorily accomplished by lectures given by plant officials or through occasional conferences held by the superintendent or department heads. Both of these methods are acknowledged to have certain values in developing plant morale and in bringing about a better understanding of certain plant policies, but the best results have been obtained through regular conferences, in which a scientific study is made of the foreman's duties and responsibilities, under the leadership of a trained foremen conference leader. The success of the conferences depends almost entirely upon the conference leader." The course is designed to cover practical matters or everyday problems which a foreman has to meet and solve. A course of this kind would seem to offer a splendid opportunity for those railroad officers who are looking for practical help in this direction.

Railway Passenger Travel

I

THERE has been much comment in the columns of the *Railway Age* of late relative to the decreasing volume of railway passenger traffic. The decline in that business—which is only too painfully evidenced by the official statistics—has been almost entirely attributed to the competition of the automobile and motor bus. The discussion, however, has taken an interesting and perhaps unexpected turn. No one, to be sure, has attempted to dispute the generally accepted thesis that the reason for the loss of passenger traffic is motor vehicle competition. Several observers have asked the question, however, as to whether the railways have done all that they might have done to meet such competition or all that they might have done to attract new business to replace such business as has been lost because of the Ford, Buick, Nash, Studebaker or Dodge.

The heaviest passenger business that the railways of this country ever handled was in 1920. In an editorial in the *Railway Age* of March 14, a tabulation was given of the passenger traffic statistics for the years 1920 to 1924. These figures showed that in 1924 the railways carried 24 per cent fewer passengers than in 1920; that the passengers carried one mile decreased 23 per cent, and that this

reduction was accompanied by a decrease of but one-half of one per cent in passenger train miles, and by an actual increase in the number of passenger car miles.

The propriety of comparing 1924 with 1920 has been questioned by some, on the ground that conditions in 1920 were exceptional. It is true that conditions in 1920 were abnormal because of the after-the-war over-inflation or extravagance which existed during that year. However, the comparison between 1920 and 1924 proves to be entirely fair as is shown by effecting comparisons with other years. Thus, to obviate the use of two years of possibly exceptional character—one, 1920, in which passenger travel might have been abnormal, and the other, 1924, in which such travel might have been subnormal—we shall use in a new set of comparisons 1923 as the latest year and for an earlier period the early nineties. This will be followed by certain comparisons between 1923 and the calendar year 1916. First, it is best to point out that the passengers carried in 1923 were 20 per cent less than in 1920, and the revenue passengers one-mile 19 per cent less. Comparing 1923 with 1892, which is an average year of the early nineties, it develops that the number of passengers carried on the country's railroads has not quite doubled and the number of passenger miles has increased about three times. The contrast with the increase in freight traffic is what creates the striking feature in the situation, because in 1923 the revenue tons of freight moved were about $3\frac{1}{2}$ times as much as were moved in the average year of the early nineties while the revenue ton-miles were about 5 times as large.

A further analysis of the figures shows that the revenue passenger miles of 1892 were doubled in 1907—16 years later—but that the 1907 figure has not been doubled to date. The figure for 1920, 13 years later, and the highest yet reached, was about 70 per cent greater than in 1907, and the figure for 1923 was about 50 per cent in excess of that of 1907. Thus, it is apparent that passenger business has never expanded as fast as freight business, and that since 1920 there has been actual and substantial decrease. It is likely that one of the factors—it unquestionably was not the only factor—that kept the passenger traffic from increasing as fast as the freight traffic was the competition of the interurban electric lines. If that is the case, the more recent competition of the motor vehicle is in many ways not entirely a new condition.

The comparison of passenger traffic in 1923 with that of the calendar year 1916—which is selected because it is the latest pre-war year—shows an increase in the number of passengers carried of 2 per cent. The passenger miles were 10 per cent greater, which is a small increase for a 7-year period. At the same time, there was a decrease of

PASSENGER SERVICE STATISTICS

Year ended June 30	Passenger revenue Acct. 102	Revenue passengers carried (thousands)	Revenue passenger miles (thousands)	Average revenue from each passenger	Average journey per pass. Ind. Rd.	Average receipts per pass. mile, cents	Revenue passengers per pass. train mile	Revenue passengers per pass. car mile	Passenger train miles	Total pass. train car miles (thousands)
1911.....	\$636,341,495	938,656	32,371,445	\$0.68	34.39	1.964	58.33	15.58	548,279,061	3,055,055
1912.....	639,818,627	944,265	32,316,263	0.68	34.22	1.978	56.95	15.11	560,877,744	3,153,776
1913.....	678,966,749	983,692	33,875,086	0.69	34.44	2.002	58.49	15.37	572,503,969	3,254,749
1914.....	683,748,602	1,002,350	34,566,985	0.68	34.49	1.976	58.87	15.40	580,792,214	3,326,639
1915.....	629,237,464	936,369	31,789,928	0.67	33.95	1.979	56.30	14.95	558,118,331	3,172,605
1916.....	673,806,175	968,888	33,645,908	0.70	34.73	2.002	58.44	15.26	569,295,585	3,310,821
Dec. 31										
1916.....	706,608,630	1,005,955	34,585,952	0.70	34.38	2.042	59.33	15.50	576,094,139	3,359,599
1917.....	825,211,593	1,066,638	39,476,859	0.77	37.01	2.090	67.76	17.23	575,500,297	3,438,682
1918.....	1,031,563,016	1,084,998	42,676,579	0.95	39.33	2.414	79.51	19.94	529,443,568	3,239,549
1919.....	1,178,453,860	1,177,820	46,358,304	1.00	39.36	2.540	84.89	20.50	539,803,363	3,413,343
1920.....	1,286,613,273	1,234,862	46,848,668	1.04	37.94	2.745	82.52	19.76	561,633,392	3,583,450
1921.....	1,151,770,842	1,035,496	37,312,586	1.11	36.03	3.086	66.57	16.41	554,804,976	3,469,062
1922.....	1,074,108,060	967,409	35,469,962	1.11	36.66	3.027	64.87	15.92	541,275,421	3,414,345
1923.....	1,145,698,579	986,917	37,957,009	1.16	38.46	3.018	67.03	16.28	560,979,720	3,585,273
1924.....	1,075,954,383	931,348	36,125,685	...	38.79	2.978	65.00	15.32	.....	.....
1923 per cent of 1916...	162	98	110	166	112	148	113	105	97½	107

2½ per cent in passenger train-miles but an increase of 7 per cent in the passenger train car-miles. There was a decrease of 2 per cent, incidentally, in the mileage of coaches, an increase of 18 per cent in the mileage of sleeping, observation and parlor cars, and increases of 2½ per cent in the mileage of dining cars and 10 per cent in the mileage of other passenger train cars. The number of passengers per train in 1916 was 59; in 1923, 67 (In 1920 it was 83) and the number per passenger car-mile was 15.5 in 1916 and 16.3 in 1923.

Can we draw any conclusions with reference to the average distance each passenger was carried, with a view to seeing whether it is the long haul or the short haul business, or both, that the carriers are losing? The average journey in 1916 is shown as 34.38 miles; in 1920 as 37.94, and in 1923 as 38.46. In other words, the average journey in 1923 was longer by 12 per cent than in 1916, but only slightly longer than in 1920. This would indicate that it was the short haul business that was suffering. Unfortunately, this does not exactly follow. The figure given as the average journey is the miles traveled on the individual road. A passenger may travel on one ticket over many railroads, particularly on one of the interline coupon tickets almost as long as the journey, or at least as long as the passenger. He would then be reported as a passenger several times and the journey per passenger in his case would be his mileage on each road over which he traveled.

Since 1916, there have been several railroad mergers. The Pennsylvania notably has consolidated its subsidiary lines by lease. Whereas a passenger traveling between St. Louis and New York formerly traveled over the Pennsylvania, the Pan Handle and the Vandalia, now he travels over the Pennsylvania alone. There were three roads in the one case but only one road in the latter case, practically the only difference being from an accounting standpoint. This merging of individual lines would alone increase the average journey per passenger.

On the other hand, there is the complication of commutation traffic. This supplies about one-sixteenth of the total passenger revenue, more nearly one-half of the total revenue passengers carried and about one-sixth of the total passengers one-mile. In 1924, the average journey of the commutation passenger was 14.6 miles, while that of the other revenue passengers was 60.3 and of all passengers 38.8. This increasing commutation business would tend to decrease the average journey of all passengers. The Interstate Commerce Commission has been reporting commutation traffic separately only since July 1, 1921, so the figures are of limited value to us here. However, they do show that the average journey of passengers other than commuters has increased from 55 in 1922 to 60 in 1924. The figures also show that commutation business in 1924 was substantially greater than in 1923 while other passenger business was less. Outside of this and our general knowledge that commutation business on many railroads is approaching a saturation point, it is impossible to determine from such general figures as we have thus far discussed the exact effect of the commutation travel in the larger picture. From the figures of the country as a whole, we are unable to determine with exactitude whether the average journey is longer than it used to be or not. This means that it is difficult to determine whether it is the long haul or the short haul business (outside of commuter traffic), or both, that the railways are losing.

However, while we may lack figures, we do not lack expert opinion, which, as a matter of fact, may often be more useful and reliable than figures themselves. Nearly all the railroads have now issued the annual reports to their stockholders for the year 1924. A striking feature in

the reports has been the practical unanimity of opinion relative to the loss of short haul traffic to the automobile and the fact that practically every executive has had something to say about it. It may be accepted, therefore, that the railways are losing their passenger traffic. It may be accepted similarly that the traffic they are losing is their short haul traffic and that they are losing it to the pleasure automobile and motor bus. The question then is, what are they doing to meet motor vehicle competition, and, finally, are they doing all that they ought to do to meet that competition?

Enginemen 100 Per Cent Efficient, Physically

A GENERAL physical examination of locomotive enginemen on an Eastern road resulted recently in disclosing that three men, out of 1700, were suffering from ailments which made it desirable that they be retired from service. A local newspaper, observing that this result is reassuring, says that regular physical examinations "should not be omitted on any large railroad which engages in passenger transportation." This is a pretty mild statement. Examinations are necessary on small as well as on large railroads; on freight as well as passenger lines; on inter-urban lines employing electric motors as well as on lines operated by steam. The mildness of the editorial is not, perhaps, to be subjected to criticism, as its writer was not pretending to deal with his subject exhaustively; but it arrests attention. A railroad is bound to respond to reasonable public sentiment. It must be said that some important railroad safeguards have not been adopted generally *until* the public made a demand for them through the press; so, therefore, newspapers may appropriately give their views on safety, as in this case. In many things the newspapers may set their standards too low. They are not experts in defining "the state of the art" of railroading at any given time. It may be observed in passing, however, that in New York city the papers often set the standard too high; asking impossible things. Because of their unreasoning criticisms the police departments in case of collision or derailment every now and then arrest an engineman who is guilty of no crime. This injustice was done recently in New Jersey (at Manhattan Transfer).

But while the officers of the law may thus be too severe, and the newspapers unreasonable or inadequate, the railroad superintendent has to take great care to be just right; not to be harsh, and not to be too easy. He cannot depend on the newspapers or on state commissions to tell him when or how to act. Three doubtful enginemen in 1700 is too many. The ideal standard would be to have all such men weeded out as soon as their weakness developed. Investigations reported by the Interstate Commerce Commission in cases of collision or derailment have sometimes shown that examinations of enginemen were faulty, both as to frequency and as to thoroughness. Judging by all of the published records relating to this feature of "safety-first" in train operation, the unpublished records would show that there is very much to be desired. Moral weakness, as well as physical or mental, has to be reckoned with. If conditions were ideal, enginemen whose powers are failing would themselves report to the superior officer, and submit to whatever change the physician might prescribe. This, however, requires such unusual moral courage that no such reporting can be depended on. The superintendent's requirements in regard to examinations must, therefore, be correspondingly severe.

Electric Locomotive Efficiency

IN the report of the Mechanical Division Committee on Electric Rolling Stock of the American Railway Association, which was presented last week in Chicago, there appears the following statement: "Generally speaking, the average thermal efficiency obtained from steam locomotives is a little greater than one-half that obtained by the operation of electric locomotives on power generated at first-class stationary plants, properly operated, and the advancement in this respect is more pronounced in the latter than in the former, because of the more favorable conditions." This is a statement which will not be accepted without argument in many quarters, but there is much evidence which will support it qualitatively if not quantitatively. In addressing the National Electric Light Association in San Francisco, Cal., on June 19, Paul S. Clapp, Department of Commerce, said: "A comparison of relative gains in fuel economy in the last four years shows that railroads were able to reduce the coal required to move one ton-mile of freight by 13½ per cent; the electrical industry reduced the amount of coal required to generate one kilowatt hour of electricity by 35 per cent." The first figure represents the relationship of coal and coal equivalents to gross ton-miles, and the latter figure is apparently based on U. S. Geological Survey records and shows the relationship of consumption of coal and coal equivalents to kilowatt hours of electric power produced by central power stations.

The efficiency of an electric locomotive is high and for this very reason is practically fixed. There is no chance for a great improvement in this direction. Electric transmission and conversion efficiency, while not so high is almost as equally inflexible and depends largely on local conditions. Improvements which are made in electric traction fuel efficiency must therefore be made in the power house. To improve upon power plant efficiency means venturing into untried fields. It is more difficult to apply fuel saving devices to locomotives than it is to stationary power plants, but to improve upon locomotive efficiency means to adapt already perfected devices and to learn how to use those already available.

At the present time, in this country, fuel saving is not a governing factor in the consideration of electrification as it is in several foreign countries. Should the disparity between power plant and steam locomotive efficiencies continue to increase, fuel saving will become highly important. The relative trend of locomotive and power plant efficiencies therefore promises to become a matter of special interest.

New Books

Proceedings of the American Railway Bridge and Building Association. 270 pages, illustrated, 6 in. by 9 in. Bound in cloth and paper. Published by the association, C. A. Lichty, secretary, 319 North Waller avenue, Chicago.

This volume contains the proceedings of the thirty-fourth annual convention of this organization which was held at Kansas City, Mo., on October 21-23, 1924. It contains reports on the placing of concrete in winter, the maintenance of water stations, smoke jacks for round-houses and the inspection of painting. It also includes papers on the effect of maintenance on the design of railroad bridges by John Lyle Harrington, consulting engineer, Kansas City, Mo.; the fire hazard of treated timber by C. S. Heritage, bridge engineer, Kansas City Southern, Kansas City, Mo.; the North Kansas City bridge by Ern-

est E. Howard, consulting engineer, Kansas City, Mo.; the bridge work of the Kansas City terminals by J. V. Hanna, chief engineer, Kansas City Terminal Railway, Kansas City, Mo.; the Eads bridge at St. Louis, Mo., by C. E. Smith, consulting engineer, St. Louis, Mo., and the construction of the Union Pacific bridge at Kennewick, Wash., by Glen H. Trout, bridge engineer, Union Pacific System, Omaha, Neb. These proceedings are edited to the high standards which have long characterized the literature of this association and contain a vast amount of practical information on the varied problems of bridge and building maintenance.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Atlas of Traffic Maps, by Wayne E. Butterbaugh and Charles E. Wymond. 25 maps, showing railroad, highway and aerial traffic routes and territories. Pub. by LaSalle Extension University, Chicago, Ill. \$6.00.

The Balance Sheet, by Alfred P. Thom. Address on service and rates before Ry. Acctg. Officers' Asso. 23 p. Pub. by Railway Accounting Officers' Association, Washington, D. C.

Commodity Prices in Their Relation to Transportation Costs. Bulletin No. 8—Corn and Oats, comp. by Bureau of Railway Economics. 12 p. Issued by Bureau of Railway Economics, Washington, D. C.

Electric Securities Edition, United States Investor, June 20, 1925. Data on location, facilities, management, and public relations of power companies and other related public utilities, with illustrations and maps. 234 p. Pub. by F. P. Bennett & Co., Boston, Mass.

Electrification Number, Long Island Railroad Information Bulletin, June 3, 1925. History of electrification on Long Island, the most recent installations, etc. 76 p. Pub. by Long Island Railroad, New York City.

Transportation in Modern Life, by C. H. Markham. President Markham's address at Univ. of Chicago convocation. 9p. Pub. by Illinois Central Railroad, Chicago, Ill.

Periodical Articles

Constitutionality of Industrial Court Law of Kansas, by Lindley D. Clark. Review, with citations of various litigations connected with this law. Monthly Labor Review, June, 1925, p. 130-136.

Fast Freight Transportation Rebuilding the Business World. Part I—The 1922-25 Business Revolution. Executives' Magazine, June 5, 1925, p. 13-14.

Five Years After, by Edward Hungerford. Progress in all lines made by railroads since passage of Transportation Act, 1920. Saturday Evening Post, June 13, 1925, p. 8-9, 175-182.

The Incidence of Freight Charges on Agricultural Products, by Henry R. Trumbower. Journal of Political Economy, June, 1925, p. 340-353.

Railway Traffic in a Transition Stage, by Charles W. Foss. Influence of motor vehicles, and consideration of value of car-loading statistics as traffic indices. Annalist, June 22, 1925, p. 837-838.

The Top Is All That Can Stop You Going Up. Interview with President Gray of Union Pacific by Neil M. Clark. American Magazine, June, 1925, pp. 34-35, p. 171-175.



Missouri Pacific Three-Cylinder Locomotive No. 1699 on Pennsylvania Test Plant

Missouri Pacific Tests Three-Cylinder Locomotive

Performance of Mikado locomotive on Altoona testing plant shows good boiler and engine efficiencies

ONE of the three-cylinder locomotives recently built by the American Locomotive Company and described in the *Railway Age*, May 16, 1925, was a Mikado (2-8-2) type for the Missouri Pacific. Before this locomotive was placed in road service it was sent to the testing plant of the Pennsylvania at Altoona, Pa., and submitted to a thorough test. The results obtained are of particular interest due to the fact that this is the first three-cylinder locomotive of which complete tests have been made.

This locomotive weighs 340,000 lb. of which 244,500 lb. is on the drivers, and has a rated tractive force at starting of 65,700 lb., this making the factor of adhesion 3.72. The two outside cylinders are 23 in. by 32 in., the inside cylinder is 23 in. by 28 in., the boiler pressure is 200 lb. and the drivers are 63 in. in diameter. The leading weights and dimensions are given in an accompanying table.

The boiler is of the straight-top type, 88 in. in inside diameter and fitted with a firebox 114 $\frac{1}{8}$ in. long by 84 $\frac{1}{4}$ in. wide. There are 199 tubes 2 $\frac{1}{4}$ in. in diameter and 45 flues 5 $\frac{1}{2}$ in. in diameter, all 19 ft. long. The superheater is a type A with 1 $\frac{1}{2}$ -in. tubes, 17 ft. 11 $\frac{3}{4}$ in. long. The brick arch is carried on two tubes 3 in. in diameter. The

grates are of the table type and the grate area is 66.8 sq. ft. The firebox is fitted with a Nicholson thermic syphon having two water legs. In addition, the barrel of the boiler is fitted with the Harter circulator which consists of a flat horizontal plate located at or about the mid-height of the boiler, extending nearly the full length of the tubes and provided with steam outlet pipes leading up from the plate to the steam space near the top of the boiler. Coal is fed to the boiler by an Elvin stoker.

The heating and superheating surfaces are divided as shown in the table below:

HEATING AND SUPERHEATING SURFACES—Sq. Ft.

	Waterside	Fireside
Firebox, alone	268	271.3
Syphon	67	79.2
Arch tubes	14	15.5
Firebox, total	349	366
Tubes and flues	3,437	3,110
Total evaporative	3,786	3,476
Superheating	1,051	1,367
Comb. evaporative and superheating	4,837	4,843

The water space in the boiler below the second gage cock is 683 cu. ft. and the steam space above is 108 cu. ft. or 14 per cent of the total boiler volume.

The total air inlet in the firebox is 28 sq. ft., 26.9 sq. ft. being through the grate and 1.1 sq. ft. above the

fire bed. The air openings through the grates constitute 41 per cent of the grate area. The net gas area of the openings through the tubes and flues is 8.5 sq. ft. The area of the air inlets to the ashpan is 14.5 sq. ft. or 171 per cent of the area of the tube and flue openings.

The locomotive is equipped with the Baker valve gear

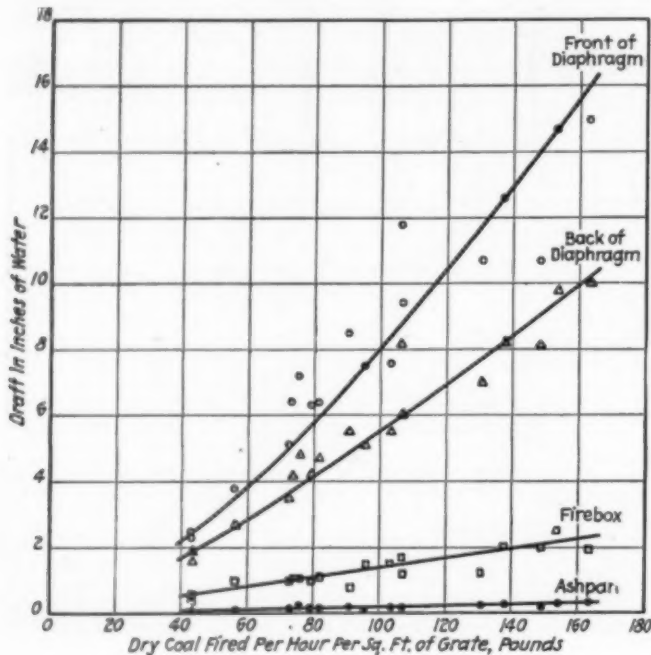


Fig. 1—Draft Records for Ashpan, Firebox and Smokebox

and the valve for the inside cylinder is operated by the mechanism employed by the American Locomotive Company for all the three-cylinder locomotives that they have built recently. The piston valves have 6½ in. maxi-

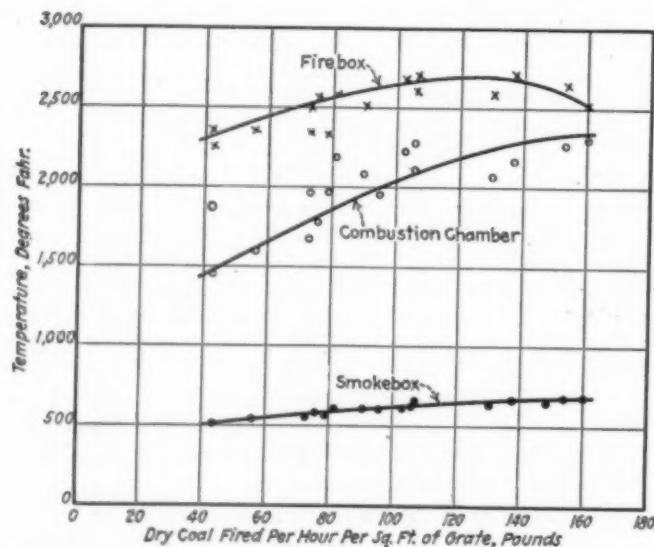


Fig. 2—Gas Temperatures in Firebox, Combustion Chamber and Smokebox

mum travel and are laid out for 1 3/16 in. steam lap and no exhaust lap.

The coal was the same as that generally used at the test plant as a standard for freight locomotive tests and road service. It is a Pennsylvania bituminous coal from the crows nest mine of the Keystone Coal & Coke Company near Hempfield Station on the main line of the Pennsyl-

vania, in the Greensburg district. It is a Pittsburgh seam coal, medium hard and semi-blocky. The coal contains about 60 per cent carbon and 30 per cent volatile matter

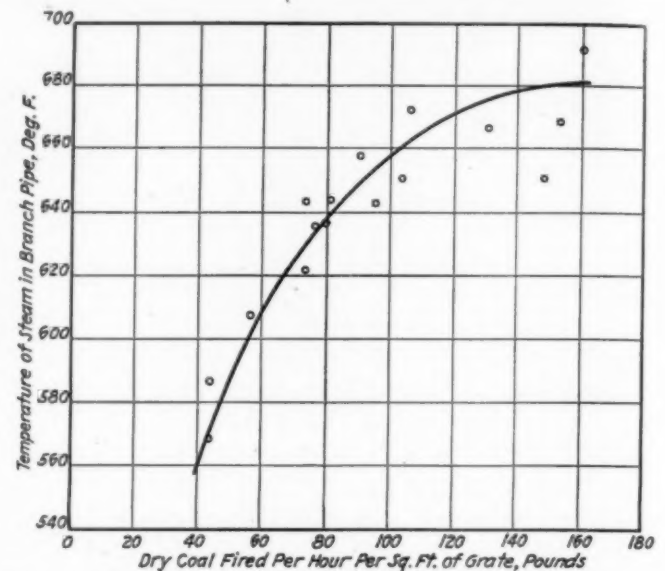


Fig. 3—Temperatures of Steam in Branch Pipe at Different Rates of Combustion

and has a calorific value of about 13,300 B.t.u. as fired. It was in run of mine size, and, while about 30 per cent of it will not go through a screen having 4-in. round

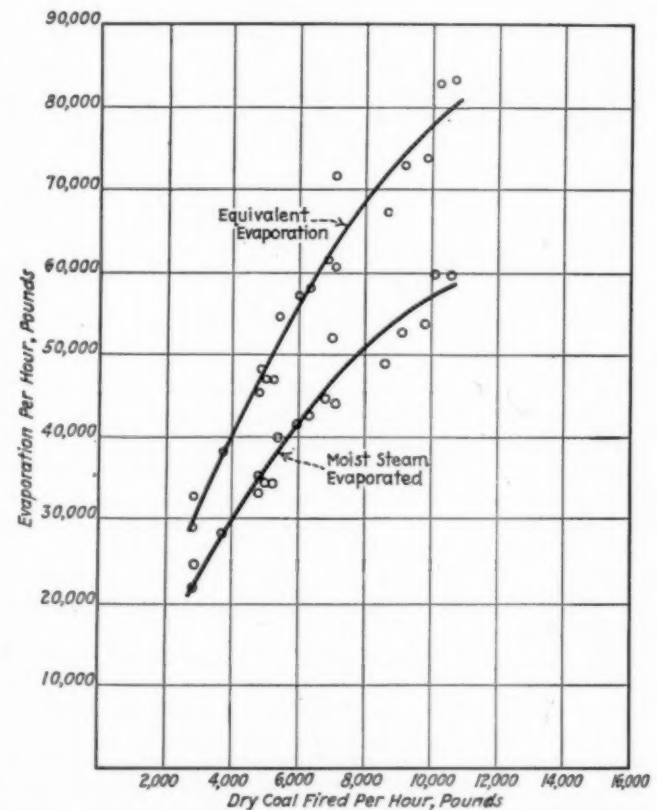


Fig. 4—Actual Moist Steam Evaporated and Equivalent Evaporation at Different Rates of Firing

openings, it contains small sizes, so that three per cent of it will go through a screen having 1/16 round openings.

When the tests were started, the driving axle bearings

had been run from Schenectady to Altoona but the crank pin bearings had been operated very little. The main crank pin bearings, both outside and inside, are of the floating type in which the brass is in three segments and separated from the rod by a hardened steel liner. The

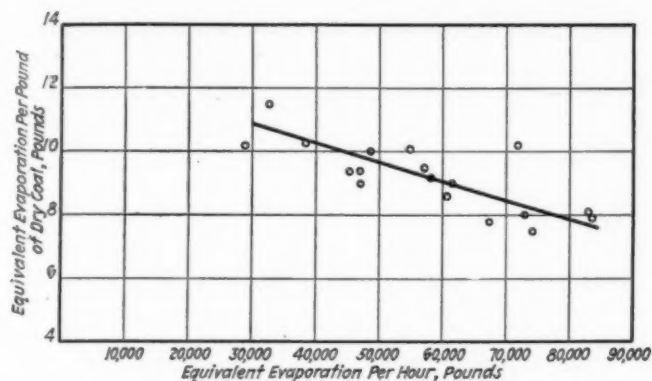


Fig. 5—Variation in Equivalent Evaporation per Pound of Dry Coal According to Boiler Output

brass bearing is perforated so that the grease has access to both its inner and outer surfaces. On the two outside main crank pins these bearings ran hot until they been well broken in, after which they gave no trouble.

As received at the test plant, the locomotive was difficult to fire and appeared to have insufficient draft. From the similarity to the Pennsylvania Lls. (2-8-2) class it was believed that with proper combustion an evaporation as high as 59,000 lb. of water per hour, or about 12 lb. per square foot of total combined heating surface could be reached. In order to determine this by actual test, a run

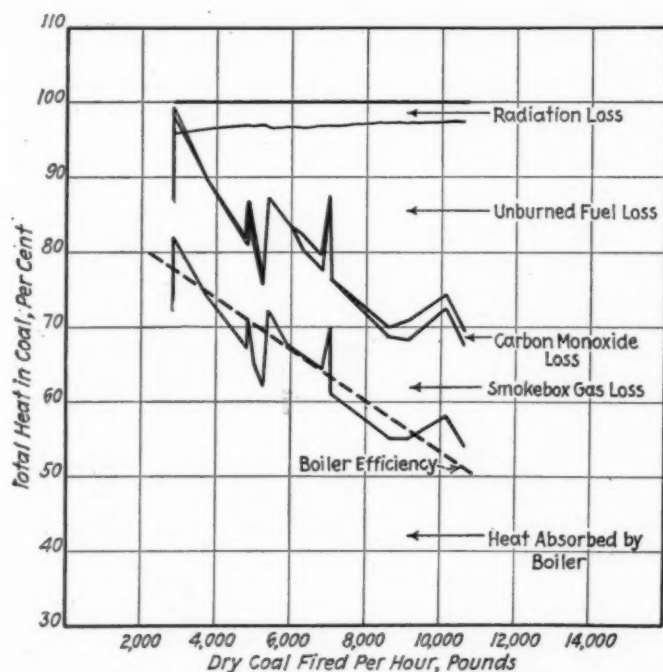


Fig. 6—Boiler Efficiency and Heat Losses

was made at 160 r.p.m., 50 per cent cut off, and wide open throttle, as soon as the locomotive had been operated on the plant enough to make such a heavy load feasible. The result was an evaporation of only 48,000 lb. per hour, or about 10 lb. per sq. ft. of total combined heating surface. The draft in the smoke box was 9 in. of water. Measurements of the velocity head of the smokebox gases

at the top of the stack showed all positive pressures, and as much as 10 in. or 11 in. of water at the edges.

The stack of the locomotive has a diameter of about 19 in. at the top, tapering to 18 in. near the top of the smokebox, and then tapering out to a much larger diameter at the lower end, which is about 2 ft. 5 in. above the exhaust nozzle.

For the purpose of improving the draft conditions, a basket bridge was fitted to the exhaust nozzle, the inside diameter of the tip was increased to 6½ in. and the stack was fitted with an extension the lower end of which was

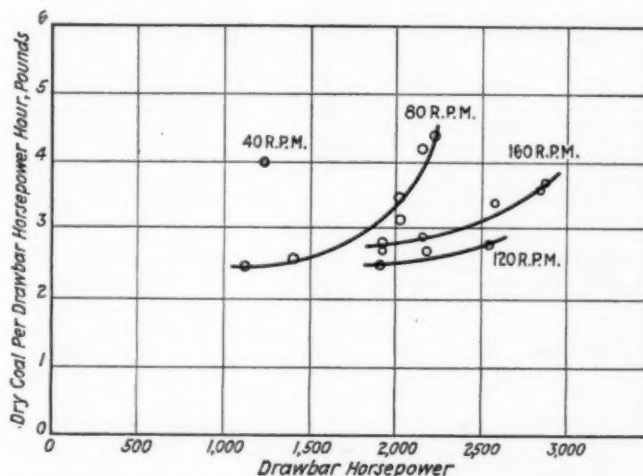


Fig. 7—Dry Coal Consumption per Drawbar Horsepower at Various Speeds and Loads

about 15 in. above the nozzle. Trials with this arrangement showed little improvement in the strength of the draft.

On account of the similarity of the boiler of No. 1699 to that of the Pennsylvania Lls. class, it was thought that the essential features of the Lls. front end, that is, its arrangement of stack and nozzle, might enable No. 1699 to steam properly. The Lls. stack has a diameter of 17

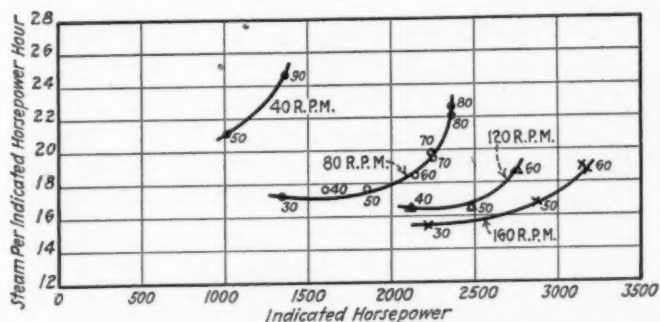


Fig. 8—Steam Consumption per Indicated Horsepower at Different Speeds and Loads—Small Figures Denote Cut-offs

in. at the base and tapers uniformly to the top where the diameter is 24 in., resulting in an area at the top about 50 per cent greater than in the original stack of No. 1699. After this stack, which was found to fit the front end arrangements of this locomotive, had been applied, and with the same 6½-in. exhaust nozzle, with basket bridge, a test at 160 r.p.m., 50 per cent cut-off and full throttle showed the limit of the boiler to have been reached at an evaporation of 46,440 lb. per hour. The pressures at the top rim of the stack were small and most of them negative, indicating a vacuum of 4 in. to 7 in. of water,

which showed that the stack was not filled. The exhaust nozzle was then increased in diameter to 7 in., retaining the basket bridge, after which an evaporation of 55,000 lb. per hour was obtained.

Notwithstanding the improvements resulting from the changes just described, the firing on heavy load tests was still difficult and the locomotive did not steam freely. Finally, the basket bridge was removed and Goodfellow projections were added to the 7-in. diameter nozzle, and this, with the Lls. stack, was found to make the steaming and draft conditions very satisfactory. It was now found

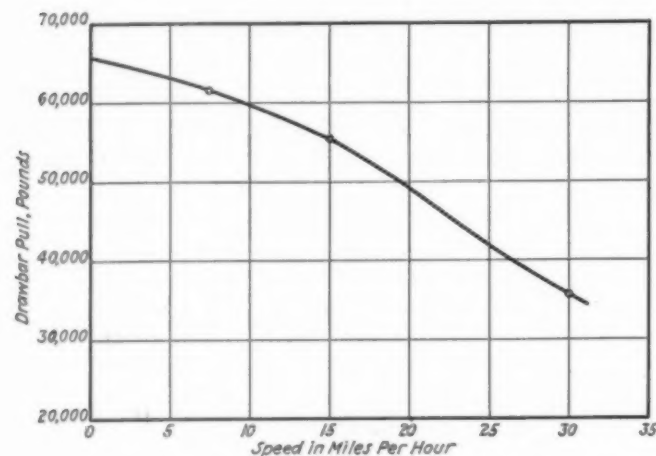


Fig. 9—Drawbar Pull at Various Speeds

possible to reach an evaporation of 59,900 lb. per hour and later, 61,680 lb. The latter figure corresponds to 12.6 lb. per square foot of heating surface per hour.

Results of Tests

A total of 28 runs were made while the locomotive was on the test plant. The duration of the runs was from

15 minutes to two hours, the majority of them being one hour long. In all but one short run the locomotive was stoker fired. A full throttle was used in all tests. Speeds were 40, 80, 120 and 160 r.p.m., or approximately $7\frac{1}{2}$, 15, $22\frac{1}{2}$ and 30.1 m.p.r. The first six runs were made with

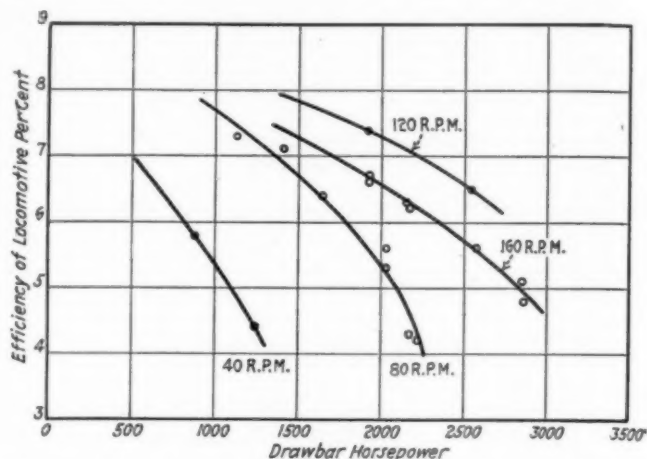


Fig. 10—Overall Efficiency of the Locomotive at Various Speeds and Loads

the smokebox arrangement as received and with a $6\frac{1}{4}$ -in. exhaust nozzle tip. Changes were then made in smoke-stack and exhaust nozzles, after which 11 runs were made with the smokestack similar to the Pennsylvania Lls. or 2-8-2 type locomotive and a 7-in. exhaust nozzle with Goodfellow projections. A general summary of the boiler and engine performances as ascertained by typical tests is shown in the accompanying tabulation. In the tables the first group or efficiency tests were with the original smokebox arrangement and the second group or capacity tests were made with the modified smokebox arrangement.

SUMMARY OF TESTS ON MISSOURI PACIFIC THREE-CYLINDER MIKADO LOCOMOTIVE NO. 1699

BOILER PERFORMANCES—EFFICIENCY											
Test designation R.P.M. cut-off throttle	Coal as fired per hr., lb.	Dry coal fired per hr., lb.	Coal as fired per hr. per sq. ft. grate, lb.	Dry coal fired per hr. per sq. ft. grate, lb.	Water evaporated per hr., lb.	Equivalent water evaporated per hr., lb.	Water evaporated per lb. of coal as fired, lb.	Equivalent water evaporated per lb. of dry coal fired, lb.	Boiler pressure, lb. per sq. in.	Temperature of feed water, deg. F.	Temp. of steam at boiler pressure, deg. F.
80-30-F	2,897	2,778	43.7	41.9	24,202	32,126	11.1	11.6	196	46	386.4
80-30-F	3,104	3,000	46.8	45.2	23,567	31,104	10.0	10.4	194	54	385.6
80-30-F	3,000	2,852	45.2	43.0	24,652	32,684	10.9	11.5	198	48	387.2
80-40-F	3,798	3,717	57.3	56.1	28,445	38,332	10.1	10.3	197	41	386.8
BOILER PERFORMANCES—CAPACITY											
160-50-F	8,821	8,636	133.0	130.3	48,925	67,349	7.6	7.8	198	44	387.2
160-60-F	10,429	10,173	157.3	153.4	59,920	82,877	7.9	8.1	199	41	387.6
120-60-F	7,285	7,056	109.9	106.4	51,974	71,845	9.9	10.2	198	42	387.2
160-60-F	11,340	10,626	171.0	160.3	59,867	83,453	7.4	7.9	198	41	387.2
40-90-F	5,275	5,005	79.6	75.5	34,504	46,890	8.9	9.4	198	44	387.2
160-60-F	12,589	11,948	189.9	180.2	61,680	84,705	6.7	7.1	197	44	386.8
ENGINE PERFORMANCES—EFFICIENCY											
Test designation R. P. M., cut-off, throttle	Total indicated horsepower	Coal as fired per i. hp. per hr., lb.	Dry coal fired per i. hp. per hr., lb.	Steam per i. hp. per hr., lb.	Tractive force based on M.E.F., lb.	Drawbar pull average lb.	Machine efficiency of loco, per cent	Overall efficiency of loco, per cent			
80-30-F	1,294	2.3	2.1	18.7	32,291	26,693	83	7.2			
80-30-F	1,268	2.4	2.3	18.4	31,642	26,571	84	6.7			
80-30-F	1,339	2.1	2.0	17.3	33,414	28,256	85	7.3			
80-40-F	1,605	2.3	2.3	17.7	40,052	35,110	88	7.1			
ENGINE PERFORMANCES—CAPACITY											
160-50-F	2,868	3.0	3.0	16.8	35,785	32,112	90	5.6			
160-60-F	3,141	3.3	3.3	19.0	39,191	35,488	91	5.1			
120-60-F	2,752	2.6	2.5	18.7	45,783	42,330	92	6.5			
160-60-F	3,176	3.5	3.5	18.7	39,628	35,718	90	4.8			
40-90-F	1,364	3.8	3.6	19.7	68,076	61,847	91	4.4			
160-60-F	3,117	4.0	3.8	19.6	38,892	35,375	91	4.3			

The boiler performance was excellent as its evaporation ranges from 6.7 lb. to 11.1 lb. of water per pound of coal as fired, according to the speed and the amount of coal burned per square foot of grate area per hour which ranges from 43.7 lb. to 189.9 lb. The boiler pressure was maintained near its intended pressure of 200 lb. per sq. in. The boiler efficiency at 11.1 lb. of water evaporation per

Additional information relative to the performance of the boiler and the engine of this three-cylinder locomotive will be obtained by an examination of the accompanying diagrams and typical indicator cards.

In previous tests of two-cylinder locomotives on the testing plant it was found that the fore and aft motion or vibration due to the unbalanced reciprocating parts be-

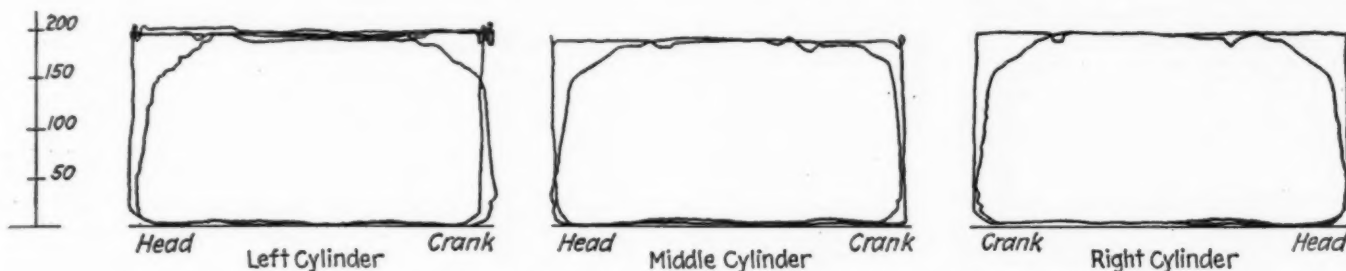


Fig. 11—Typical Indicator Cards at 7.5 m. p. hr., 90 Per Cent Cut-off and 1,364 Indicated Horsepower

pound of coal was 83 per cent—very good even in stationary service—and was 49 per cent at the time when the boiler was forced to its limit at high speed and at its maximum evaporation of 61,680 lb. or an equivalent evaporation of 84,705 lb. per hour. The superheat in the steam was always near 250 to 280 deg. F. making the total temperature of steam approximately 675 deg. F.—a desirable condition of superheat. All results show the

came so severe at a speed below 200 r.p.m. that additional balance weights were needed in the wheels for test plant operation and it has been customary to add sufficient weights to balance completely all the reciprocating weights. With this three-cylinder locomotive no additional balance weights were applied and a speed of 235 r.p.m. was reached before the fore and aft vibration became violent enough to endanger the mechanism of the

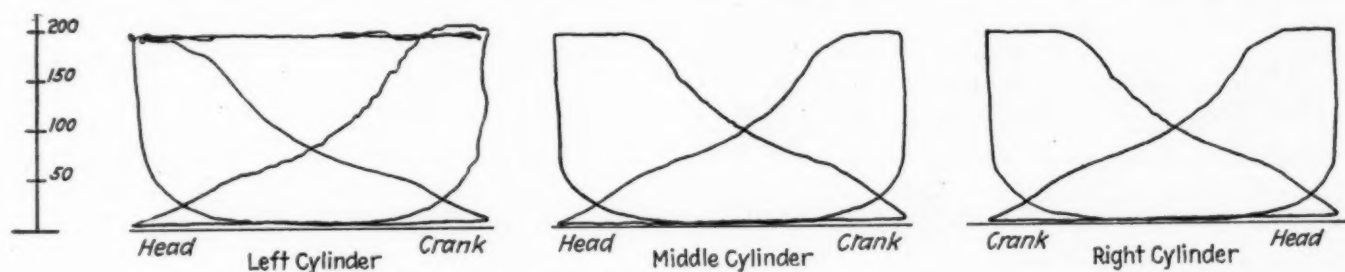


Fig. 12—Typical Indicator Cards at 15 m. p. hr., 30 Per Cent Cut-off and 1,339 Indicated Horsepower

boiler to be well proportioned in firebox, grate area, heating surface and steam space and also in superheating surface.

The engine performance was equally as good. The calculated nominal tractive force is 65,700 lb. and the locomotive developed a drawbar pull of 61,847 lb. at a speed of 7½ miles per hour and 90 per cent cut-off. The maximum power developed was 3,176 hp. which was

dynamometer. It was the conclusion that without special counterbalancing a two-cylinder locomotive could be operated safely at a speed of 180 r.p.m. and a three-cylinder locomotive at a speed of 240 r.p.m., or at approximately one-third greater speed. At all speeds the drawbar pull lines were more even than those obtained from two-cylinder locomotives.

No measurements were taken of the turning moment or

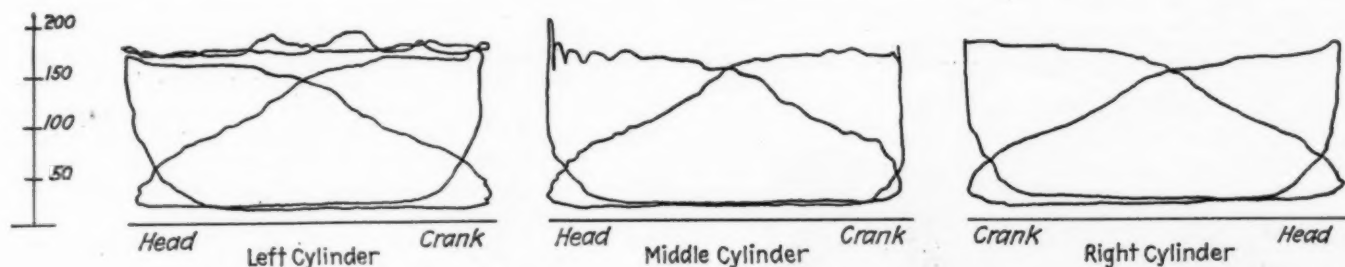


Fig. 13—Typical Indicator Cards at 30.1 m. p. hr., 60 Per Cent Cut-off and 3,176 Indicated Horsepower

reached at a speed of 30 miles per hour and 60 per cent cut-off, with an engine efficiency of 90 per cent. The maximum engine efficiency of 94 per cent was reached at a speed of 15 miles per hour and 80 per cent and 90 per cent cut-off, which shows an excellent performance for the locomotive.

torque for comparison with the usual two-cylinder arrangement.

In conclusion it may be said that with the exception of the front end arrangement the efficiencies of both boiler and engine and the boiler capacity were excellent. This will be evident from a comparison of the results of the

tests of this locomotive with those of two cylinder locomotives of comparable dimensions.

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Railroad	Missouri Pacific
Type of locomotive	2-8-2, 3-cylinder.
Service	Freight.
Cylinders, diameter and stroke, outside	23 in. by 28 in.
Cylinders, diameter and stroke, inside	23 in. by 28 in.
Valve gear, type	Baker.
Valves, piston type	
Maximum travel	6½ in.
Outside lap	1½ in.
Exhaust clearance	0
Weights in working order:	
On drivers	244,500 lb.
On front truck	34,500 lb.
On trailing truck	61,000 lb.
Total engine	340,000 lb.
Tender	190,100 lb.
Wheel bases:	
Driving	17 ft. 10 in.
Total engine	37 ft. 5 in.
Total engine and tender	72 ft. 3½ in.
Wheels, diameter outside tires:	
Driving	63 in.
Front truck	33 in.
Trailing truck	43 in.
Boiler:	
Type	Straight top.
Steam pressure	200 lb.
Fuel, kind and B. t. u.	Bitum.—13,300.
Diameter, first ring, inside	88 in.
Firebox, length and width	114½ in. by 84¼ in.
Height mud ring to crown sheet, back	68½ in.
Height mud ring to crown sheet, front	90½ in.
Arch tubes, number and diameter	2, 3 in.
Thermic syphons	2
Tubes, number and diameter	199, 2¼ in.
Flues, number and diameter	45, 5½ in.
Thickness tubes and flues	120 in.—148 in.
Length over tube sheets	19 ft.
Net gas area through tubes and flues	8.5 sq. ft.
Air inlet through grates	26.9 sq. ft.
Air inlet above fire bed	1.1 sq. ft.
Air inlet to ash pan	14.5 sq. ft.
Grate type	Table.
Grate area	66.3 sq. ft.
Heating surfaces:	
Firebox and syphon	335 sq. ft.
Arch tubes	14 sq. ft.
Tubes	2,214 sq. ft.
Flues	1,223 sq. ft.
Total evaporative	3,786 sq. ft.
Superheating	1,051 sq. ft.
Comb. evaporative and superheating	4,837 sq. ft.
Special equipment:	
Brick arch	Yes
Superheater	Type A
Feedwater heater	No
Stoker	Elvin
Tender:	
Water capacity	10,000 gal.
Fuel capacity	16 tons
General data estimated:	
Rated tractive force, 85 per cent.	65,700 lb.
Cylinder horsepower (Cole)	2,737
Speed at 1,900 ft. piston speed	35.2 m.p.h.
Steam required per hour	51,900 lb.
Coal required per hour, total	8,800 lb.
Coal rate per sq. ft. grate per hour	134 lb.
Weight proportions, estimated:	
Weight on drivers + total weight engine, per cent.	71.9
Weight on drivers + tractive force	3.72
Total weight engine + cylinder hp.	124.2 lb.
Total weight engine + comb. heat. surface	70.3 lb.
Boiler proportions, estimated:	
Comb. heat. surface + cylinder hp.	1.76
Tractive force + comb. heat. surface	13.58
Tractive force X dia. drivers + comb. heat. surface	856
Cylinder hp. + grate area	41.3
Firebox heat. surface + grate area	5.26
Cylinder hp. + gas area (tubes and flues)	322
Grate air inlet + grate area, per cent.	40.5
Ash pan air inlet + grate area, per cent.	21.8
Firebox heat. surface, per cent of evap. heat. surface	9.2
Superheat. surface, per cent of evap. heat. surface	27.8
Tube length + inside diameter	113



Lehigh & Hudson River Milk Car Built by the American Car & Foundry Company

Conference Circuits, Feature of Railroad Exchange

A NEW private branch automatic telephone exchange serving the general offices of the Missouri Pacific and its St. Louis terminal has, as a unique feature, a separate circuit for conference purposes. This circuit, which is for the exclusive use of 25 of the higher officers, can be used without interruption by manual operators or from the automatic telephone system. The development of this private conference wire system followed a survey made jointly by the Missouri Pacific telegraph department and telephone engineers of the Bell System, at the suggestion of L. W. Baldwin, president of the Missouri Pacific, who desired a private telephone wire over which he could talk directly to the higher officers under him without the necessity of talking first to their secretaries. At the same time this system permits as many as ten lines to be connected to the conference line, allowing two-way conversation on all lines connected in much the same manner as if all parties thereto were present in one office.

Those officers having telephones on the conference circuit usually have an extra telephone on their desks with no connection to their outer offices, from which they may call any number in the entire system, long distance or city exchange, as well as any of the 25 telephones on the private conference system. To prevent unauthorized persons from calling the higher officers, personally, these conference phones are restricted in that they cannot be dialed by any station in the automatic exchange except those in the conference group. The numbers of the 25 telephones in the restricted group are not listed in the directory; moreover any party not in the group who dials one of the conference phones is immediately connected with a manual operator who advises the calling party of the number on the unrestricted list, compelling him to first reach the secretary of the officer called, rather than the officer himself.

There are two lines for conference purposes, one reserved exclusively for the use of the president and one which may be used by the other 24 officers having telephones in the restricted group. Assuming that the president desires to confer by telephone with the general manager, chief engineer, and general superintendent, he will call each party in turn, requesting them to dial his conference line number, after which he will dial the same number and all will then be connected to the president's conference line and can converse without interruption from any source. A similar procedure is followed in using the second conference line, the party calling the conference notifying each one to dial the second line.

The railroad exchange, aside from the conference line feature, is a typical semi-automatic private branch exchange with trunk lines running to a manual city exchange. Calls to the city exchange from any Missouri Pacific telephone are made by dialing the proper number and giving the city exchange operator the number desired. Special calls are provided for securing the railroad's own long distance lines, the city exchange long distance lines and the chief operator.

The plant including the private conference circuit represents an investment of approximately \$70,000 and was placed in operation in March, 1925.

EMPLOYEES of the National Railways of Mexico have been placed under the department of communications so that as government employees they are denied the right to strike.

Great Northern Stores Officers Discuss Their Problems

Topics of general as well as local interest considered at system convention at Superior, Wis.

APPROXIMATELY 32 stores department officers of the Great Northern, with a number of visitors, gathered at Superior, Wis., on June 19 and 20, for the second annual convention of the Great Northern Stores Association. Howard Hayes, general stores officer of the road and president of the association, presided at the sessions. The proceedings included an address by J. A. Murphy, attorney of the Great Northern, on the railway situation in the Northwest; a report on the recent convention of railway purchasing and stores officers at St. Louis; and reports and discussions on stock balances, the control of working stock for repair tracks and shops, mechanical handling equipment, lumber storage, the beautifying of store grounds, fire prevention, store accounting, handling bridge and building work sheets, scrap handling and reclamation. The latter report was supplemented by a report of inspections made of certain reclamation facilities on other lines. Information concerning the testing department's work was also presented in a paper by the chief chemist on the inspection and testing of materials. Suggestions were also made by the auditor of capital expenditures concerning this phase of stores work.

The convention went on record as opposing the adoption of the A.R.A. standard classification of material in place of its own classification. Following are the recommendations of most general interest produced during the sessions.

The Handling of Scrap

Scrap should be picked up and delivered to the bins daily. The scrap bins at small stores where scrap is not accumulated in carload lots should be emptied at least every 30 days and the contents shipped to concentration points for sale. Scrap on hand not only increases the stock balances but represents an investment which can be converted into money. Scrap should be carefully sorted according to its classification when received at local stores to permit the subsequent loading of any classification without further sorting.

In the absence of reclamation plants, all scrap should be dismantled before its collection to permit classifying the component parts and the recovery of any usable materials. Any scrap not dismantled when received should be accumulated for dismantling periodically.

The loading of scrap by hand has been found to cost

from 30 to 50 cents per ton, while with the aid of a magnet the cost varies from 3 to 8 cents per ton, according to the class of scrap handled. At St. Cloud, Minn., where all scrap (amounting to approximately 20,000 tons per year) is loaded with a magnet except scrap frogs and rail, which are handled with a locomotive crane and slings, the saving from the use of the magnet is approximately \$7,000 per year.

The oxy-acetylene welding process for repair and reclamation work has saved many thousands of dollars since its introduction on the property as shown by the store records of supplies disbursed.

Lumber for Bridges and Buildings

Emergency stocks for bridge and building work should be turned over at least once a year. To avoid delays and confusion, all shipments of lumber for bridge and building repairs called for in work sheets should be made with a view to the shipping instructions on the requisitions and to the location and wants of the bridge and building gangs as determined by special inquiry immediately prior to shipment.

Studies made at Everett, Wash., while receiving approximately 350 carloads and shipping 400 carloads, involving 430 sizes, disclosed the cost of handling bridge lumber to average 55 cents per 1,000 ft.

The service of stores officers, with their records of the actual quantities of timber used in past years, should be utilized by the engineering departments when making preliminary estimates of lumber requirements for purchasing. Experience indicates that failure to do so often causes confusion in filling orders and slows up the release of cars through deficient estimates. The disparity possible between preliminary engineering estimates on which orders for work sheet materials is based and the actual quantity of timber finally required, also the close comparison existing between the latter figure and estimates based on stock book records, are illustrated by the accompanying table of conditions on one division.

Labor Saving Devices

Except in rare instance, a payroll reduction is the only effective argument in support of a recommendation for additional equipment for handling material. It is not enough that a machine under consideration may have

Timber	1923			1924			1925		
	Eng'r est.	Work sheet	Stock book est.	Eng'r est.	Work sheet	Stock book est.	Eng'r est.	Work sheet	Stock book est.
14 x 14 x 14 ft.....	100	523	500	300	964	600	200	953	800
8 x 16 x 28 ft.....	100	926	250	500	1,626	800	200	985	1,000
8 x 16 x 32 ft.....	0	84	50	0	91	100	0	357	200
Guar'l rails, cedar and fir.....	2,500	10,404	6,000	4,000	12,500	7,000	5,000	9,898	8,000
4 x 12 plank.....	0	4,448	1,500	4,000	4,510	2,000	500	2,500	3,000
4 x 4 x 24.....	0	500	200	250	350	300	160	400	350
6 x 8 var. lg.....	0	1,138	300	600	409	500	300	1,525	600
8 x 8 x 10 ties, fir and cedar.....	1,500	2,295	2,000	1,300	4,908	4,000	1,800	3,300	3,000
30 ft. cedar pile.....	100	286	200	.....	.....	.....	.....	.....	.....
40 ft. cedar pile.....	100	363	300	.....	.....	.....	.....	.....	.....
45 ft. cedar pile.....	.....	.....	.....	.....	.....	.....	50	262	100
Total number of items.....	55	105	.....	65	110	.....	34	137	.....

effected economies in operation on some other road or store. Local conditions govern and must be studied to determine just what can be accomplished. A lack of system or of a carefully worked out plan in the use of mechanical equipment may easily result in a decrease in the efficiency of from 10 to 25 per cent.

A locomotive crane equipped with a magnet will do the work of from 10 to 25 men in loading or unloading scrap or metal products from open cars. Experience indicates that oil-burning cranes are more economical than coal-burning cranes where oil is available.

Fordson tractors have demonstrated their value at a number of stores and lumber yards. In certain places auto trucks are proving profitable.

Three-wheel lumber buggies have proved highly efficient in lumber yards. It is essential, where tractors are used, that the number of trailers be sufficient to keep the tractors busy and to avoid manual handling.

Fire Precautions

Following are the principal precautions which stores officers were advised to take in protecting store facilities and contents from fire.

Lumber yards should be so located that they will not be in the range of flying sparks from passing engines and should be liberally supplied with fire hydrants, hose and other fire fighting apparatus.

Premises should be kept clean of all accumulations of rubbish.

Oil and gas tanks should be built at a safe distance from other buildings.

Water barrels should not be allowed to become empty.

Storehouse fire hose should be tested at least every 90 days.

Charcoal should not be carried in stock without frequent rehandling.

Inflammable liquids should not be left or shipped in leaky containers.

Matches or other inflammables or explosives should not be loaded in cars without providing adequate protection against dislodging or jarring.

Persons should not be allowed in the oil house with lighted torches or lanterns.

Smoking should be prohibited in storehouses, oil houses and lumber yards.

Maximum and Minimum Stocks

By A. J. Munn

District Stores Officer, Great Northern, Superior, Wis.

A difference of opinion has always existed, and doubtless will continue to exist, upon the question of what constitutes a proper stock of material in any given case. This results from differences in point of view. Mechanical officers are keenly interested in the stock of material on hand for repairs to equipment, and believe that a large stock of this material should be carried to avoid any delay whatsoever. They are only vaguely interested in the quantity of track bolts, spikes and rail which may be available for the needs of the maintenance of way department. On the other hand, the executive and financial officers are interested primarily in the amount of money spent for material and the investment represented by stocks of material. A large stock does not always eliminate delays for material and is an unsound condition economically. Neither does a small stock balance invariably indicate a proper condition.

There is no yardstick by which to measure any given

stock of material which will enable any one to say that such and such a sum should be invested in that stock. There is no measure which can fix even an approximate figure. Comparison of the balance of one stock with that of another stock, or with the same stock at another time, reveals only the relation of the stock balance to the normal amount, or to the average of other stocks. Therefore, effective methods of stock control go beyond the balance sheet to the actual individual articles constituting the stock.

The purpose of maintaining stocks of material is, of course, to supply the wants brought about by the operation of the railroad. If it were possible to have an ideal condition of production and distribution of material, such wants could be filled as they arose without the necessity of investing money in a stock of material. As that condition can never be reached, the alternative is to endeavor to maintain a stock at the most effective level, which will avoid, on the one hand, losses from shortage of material, and on the other hand, losses from excessive investment. Consideration of the factors necessary to such an efficient condition will point out the advantages and disadvantages of the maximum stock and also of the minimum stock.

The expected benefit to be derived from a maximum stock is that it will or should eliminate all losses from delays for material. But this expectation is seldom if ever fully realized. Even though the stock be well selected and well maintained, there will still be wants that cannot be supplied from stock, if any consideration whatever has been given to the investment. On the other hand the preponderant majority of all possible delays may be avoided and it remains only to determine the point at which it becomes more expensive to maintain the stock than it would be to suffer the losses from delays. In such a determination all of the factors entering into the cost of maintaining stock must be considered. Interest upon the amount invested is the feature that is usually mentioned, first, although it does not usually constitute the greater part of the expense, and in many cases is not the largest item. In addition to the interest charge, there is also a heavy percentage of expense for depreciation, labor for handling, insurance, cost of storage and protection against fire and theft. There is also the loss from obsolescence which is constantly occurring in any general diversified stock, and which in a highly specialized stock frequently is responsible for a total loss. Generally, the conditions of the individual case govern the cost. However, practically all estimates indicate that the interest item is not more than half the total, and many place it at one third or less. In other words, estimates vary from 12 to 18 per cent. It must be remembered that these figures apply only to well kept diversified stocks, and that the costs mount rapidly in less perfectly kept stocks. It will be seen that none of these items of cost, real and indisputable as they are, appear as a definite item in the accounts of the railroad. Therefore, while one knows that it costs money to maintain a stock, one does not know how much money it costs in any given case.

If, however, in an endeavor to avoid such expense the store officer approaches the other extreme (a minimum stock) he will find himself beset by other forms of loss and expense. These will not usually be in direct relation to the size of the stock because the degree of excellence in the choice and maintenance of the stock is an important factor. An instance is the mechanic who is compelled to return to a job a second time, the removal of material from one locomotive or car for application to another, the substitution of unsuitable material, temporary

work, repairing articles the condition of which does not justify the expense, loss of interest in the work on the part of mechanics when it is held up for material, loss of the use of equipment or facilities and finally direct loss of revenue tonnage on account of being unable to handle the business when offered. It is by no means always true that if the freight is not hauled today it will be tomorrow. A conspicuous example of the loss of revenue that may result from delayed repairs to equipment can be furnished by citing the case of the locomotives in ore service, the gross revenue derived from a train of ore which these engines haul, being in excess of \$9,000, is also the approximate cost of keeping one of these engines out of service for one day at some seasons. The sum of \$9,000 will maintain a stock of \$50,000 for an entire year.

The minimum stock which makes a good showing on the balance sheet in reality usually is a much heavier draft on the treasury than a large stock. Study of the subject furnishes conviction that stock regulation must go beyond stock balance figures. The question of how much stock shall be carried should be decided by items upon the merits of each. The stock book, not the balance sheet, should be the controlling element. However, it is necessary to have the stock books complete and to include all of the material which should be on hand.

Hearings on Proposed New York-Pittsburgh Line

WASHINGTON, D. C.

CONSTRUCTION by the New York, Pittsburgh & Chicago Railroad of a short, low-grade line between Pittsburgh and Easton, Pa., is essential to a proposed new trunk line between New York and Chicago, L. F. Loree, president of the Delaware & Hudson, testified on Monday as the representative of the E. H. Harriman estate, before Director Mahaffie, of the Commission's bureau of finance.

Mr. Loree described the project as "the backbone of the premier line of the United States," to be 100 miles shorter than any existing line between New York and Chicago. Mr. Loree testified his confidence in the necessity for the new road and the ability of its promoters to finance it. He said that the project had been under consideration for 20 years past. He recounted its history since first planned by Joseph F. Ramsay, Jr., who disposed of the charters, franchises, etc., to Mr. Harriman in 1908. Mr. Loree said he had been acquainted with the project since 1907.

"Mr. Harriman asked me to go over the engineering reports on the projected line from Pittsburgh to the east which had been brought to him by Mr. Ramsay, Jr.," said Mr. Loree. "I figured over the project and told him it deserved serious consideration. Mr. Harriman accepted my recommendation, first taking an option on the line, and in 1908 paid \$290,000 for its franchises and rights. It is now proposed that the Interstate Commerce Commission grant the permission to proceed.

Construction cost was estimated by Mr. Loree at \$728,000 a mile. He admitted that the cost appeared to be extreme as compared to \$376,000, the estimated figure in 1907, but he stated that young Mr. Harriman was in a position to finance the project adequately.

F. A. Molitor, president of the New York, Pittsburgh & Chicago, testified that in 1913 he was engaged by Mr. Loree to make a survey of the proposed line and that he submitted a report in the following year recommending several changes in the original plan. According to Mr.

Molitor, the present estimated cost of \$728,000 a mile includes \$93,000 a mile for interest during the construction period and \$127,000 a mile for equipment, in addition to the cost of \$508,000 a mile for the road-bed. This figure was compared by Mr. Molitor with the construction cost of several railroad projects in previous years, notably the Lackawanna which cost \$425,000 a mile and Mr. Molitor estimated, now would cost \$950,000.

W. B. Harris, of New York, a consulting engineer, testified concerning traffic volume. He submitted charts delineating the increase in the volume of traffic on existing lines during the past 20 years. The purport of his testimony was that, if traffic continued to increase in the same ratio, the new line would be necessary to provide adequate transportation service in the territory affected. Mr. Harris testified later, under cross-examination, that a more detailed study of the project would be made if the commission approves the company's application.

The trunk lines opposed to the Harriman project were represented at the hearing by Daniel Willard, president of the Baltimore & Ohio; Clyde Brown, general solicitor of the New York Central; F. D. McKenney, of the New York Central, and others.

Mr. Willard declared that the new line could prosper only at the expense of the existing lines. He stated that there has been no congestion due to lack of road haul capacity in the territory involved since the 1922 shopmen's strike and the B. & O., he asserted, is capable of expansion to meet future traffic needs. As no suggestion has been made by the promoters of the line that it is planned to increase terminal facilities, the assumption is, facilities. Adjournment was taken on Tuesday until June 30.

Preliminary Report on C. I. & L. Train Control

WASHINGTON, D. C.

THE Interstate Commerce Commission has made public a letter addressed to H. R. Kurrie, president, Chicago, Indianapolis & Louisville, regarding the preliminary inspection of the installation of the intermittent magnetic train-stop device of the Sprague Safety Control and Signal Corporation on the 20.2 mile, single track section of its line between Shelby, Ind., and Rensselaer, Ind. As a result of this inspection, the following criticisms and comments are offered:

1. Approach signals to sidings are provided with a by-pass circuit to prevent the signals in the rear from assuming the stop position when the control relay circuit is opened by the approach signal going to caution. It is suggested that consideration be given to some other method of securing the end sought.
2. A magnet should be provided at braking distance from the signals governing entrance to train-control territory at each end.
3. All track magnets should be regularly inspected to insure that they are in operative condition, and after each renewal of battery wire, or magnets, they should be inspected to insure that proper connections of the neutralizing circuits have been made.
4. It is suggested that the type of fouling protection employed at sidings be considered with a view to possibly securing increased protection.
5. The beginning and end of automatic train control territory should be plainly indicated.
6. It is suggested that the high-speed feature of the device be placed officially in service or that the high-speed brush be removed from the several governors.
7. Five instances were noted in which a certain locomotive passed a signal indicating caution at speeds of 45 to 55 miles per hour—speeds in excess of the predetermined limiting speed—and

failed to secure an automatic brake application when the engineer operated the forestalling switch while passing over the track magnet. Obviously, the locomotive circuits should be so revised as to overcome this difficulty, and we are advised by the representative of the proprietor that this has already been arranged for. It should be stated, however, that an automatic brake application was received in all cases observed when the engineer did not operate the forestalling switch.

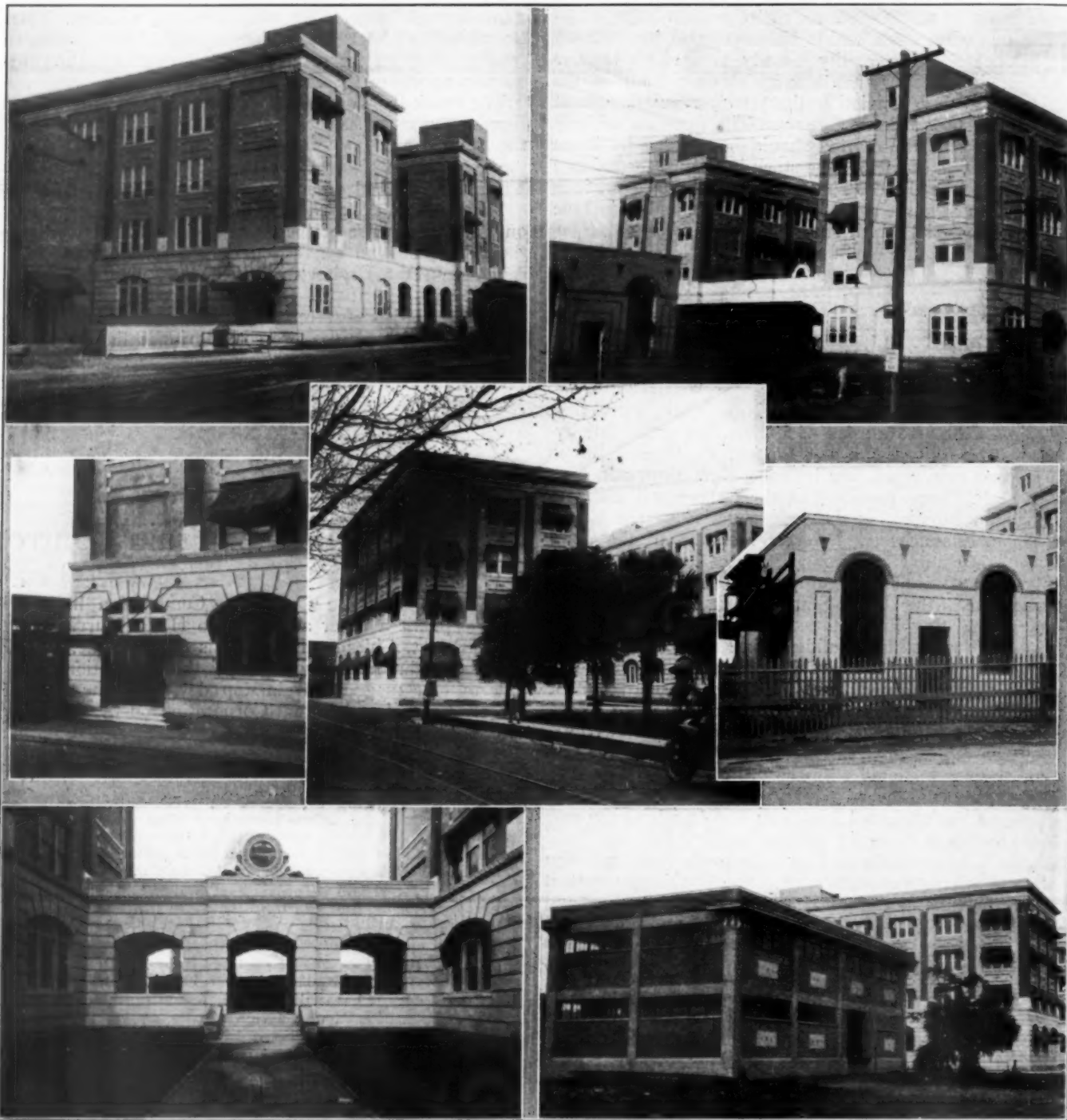
8. If the oil reservoir is to be maintained separately from the brake-valve head, as now installed, it is essential that the integrity of the connecting pipe be insured, because excessive leakage might and breakage of this pipe or its connections would result in a false clear failure at a stop indication point.

9. The magnetic receiver on the locomotive must respond to track impulses at all speeds up to the maximum possible, and the equipment company has a standard of adjustment which it is essential shall be insured through maintenance either by the equipment company or by the railroad acting under instructions of the equipment company and that this receiver shall be maintained in a sealed condition.

10. The speed governor brushes should be adjusted for predetermined speed and such adjustment maintained.

11. Provision should also be made for keeping accurate records of daily terminal tests and repairs, as well as for adequate reports of performance. A regular maintenance program for the locomotive apparatus should also be developed and made effective.

The Florida East Coast's General Office Buildings at St. Augustine, Fla.



The Buildings Are as Attractive from the Rear as from the Front

Another Rear View of the Buildings, Showing the Heating Plant at the Left

The Side Entrance is Attractive

The Arrangement of the Buildings Provides a Maximum of Light

The Heating Plant Is Attractively Designed

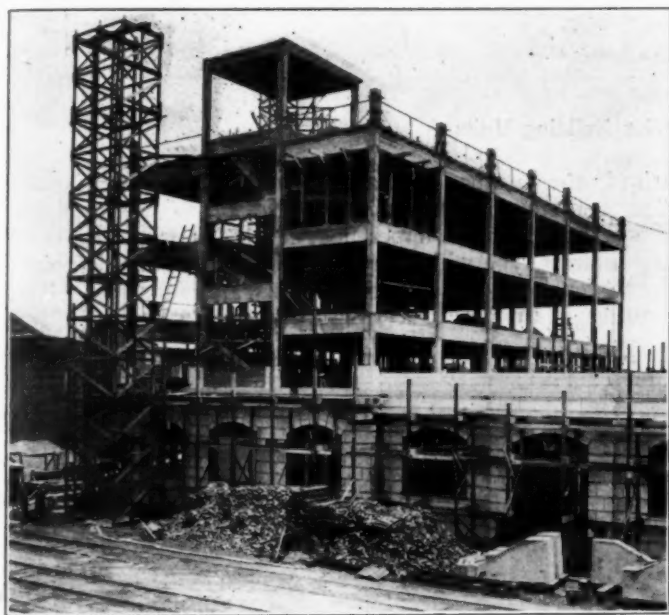
One of the Arcades Between the Office Units, Showing the Railroad Monogram Above the Steps

A File Storage Building Was Included in the Layout

Attractive Architectural Treatment Used on New Office Units

*Modern buildings for Florida East Coast at St. Augustine,
Fla., capable of expansion as needed*

IN modernizing its general office facilities at St. Augustine, Fla., the Florida East Coast has adopted a design that not only results in an attractive and efficient structure but provides for easy expansion as additional space becomes necessary. The design includes the use of office building units, each an individual structure and housing either one or several closely related departments of the railway. Two of these units have been built and are in service while a third is now under construction. The structures are of reinforced concrete



Office Building, Unit No. 2, Under Construction

frame construction and have been architecturally treated in an interesting manner to produce a pleasing and harmonious appearance.

The building site is on the corner of King and Malaga streets, two thoroughfares of the city of St. Augustine, and adjoins the passenger station facilities of the railway. Unit No. 1, which was the first building to be constructed, occupies the corner and was built flush with the sidewalks. Unit No. 2 is separated from it by a court 50-ft. wide containing a centrally located concrete walk with grass plots on either side. The third unit will be similarly spaced. All units are identical in design, construction and finish, the only variation being in the arrangement of the office space. Each unit is a four-story structure without basement, 50 ft. wide by 105 ft. deep. The entrances are located in the sides of the buildings at the extreme rear, those opening on the court being connected by an arcade, architecturally treated to correspond with the buildings proper. Steps located centrally in the arcade lead down to the walkway in the courts and to a walkway along the rear of the building which connects up the new office units with the other buildings situated at this point.

Owing to an unstable soil consisting of mud, sand and

clay, the building foundations were carried on concrete footings supported by pile clusters. The footings in the majority of cases were 7 ft. 8 in. square with 9 piles under each one. These footings carried reinforced concrete columns poured integrally with the footings, and the reinforced concrete beams and floor construction. Around the exterior walls the footings were spanned by a reinforced concrete beam which in turn carried a limestone base upon which the exterior wall construction was supported. The intermediate columns on the exterior longitudinal walls were 16 in. by 19 in. in section, the corners 16 in. by 16 in., and the remaining exterior wall columns were 16 in. by 18 in. in the front and 16 in. by 19 in. for those in the rear. The interior columns with the exception of those near an elevator shaft, which were 21 in. by 21 in., were all uniformly 19 in. by 19 in. These sizes were for the columns below the first floor only, the size of column decreasing for each successive floor as the load diminished.

The column spacing longitudinally was 16 ft. 10 in., there being two rows of columns in the interior so spaced transversely as to give a corridor between the rows and to leave an unbroken floor for the remainder of the area normally sub-divided into offices. The reinforced beams in the outer walls at each floor level were uniformly 8 in. thick by 30 in. deep. On the interior, the beams are 16 in. by 16 in. in dimension and run longitudinally except around the elevator shaft where the usual form of construction was followed. This form of construction was used in order that a flat ceiling could be provided and owing to the spans which resulted necessitated a heavy floor construction. The floors were of reinforced concrete, using steel tile 12-in. deep plus four inches of concrete, the ceilings being plaster on 24 gage $\frac{3}{8}$ -in. metal lath. The partitions between offices, and between offices and the corridor are of gypsum blocks. The first floor is 4 ft. above the ground level, and the spacing above it respectively 14 ft. between the first and second and 12 ft. 6 in. for the remainder.

The walls above the limestone base are of common building brick, faced in a variety of ways to secure an attractive exterior. White terra cotta tile was used between the base and the sills of the second floor windows, the upper edge being finished by the use of an ornamental belt of the same material. The arcade was likewise surfaced with white terra cotta, the ornamental belt being continued across it with a parapet of white tile surmounting the belt. All doorways and windows on the first floor level of the buildings as well as the openings in the arcade were arched, using an 8 ft. 9 in. radius. The tile was so laid as to give the effect of an arch ring over each opening. The exterior entrances, that is, those that do not open into the arcades, were finished with marquees supported by wrought iron chains. An extra ornamental touch was given to the arcades by placing a terra cotta cartouche or shield on the parapet over the front entrance to each arcade. This is an enlarged reproduction in blue and white tile of the standard shield or trademark of the system and, in a circular center field, shows a passenger

treads and risers were used from the first to the fourth floor and marble wainscoting from the first to the second floor.

In conjunction with the office building units there was constructed a record storage or file building having two stories and measuring 39 ft. 4 in. wide by 76 ft. long. This is also a reinforced concrete framed structure, similar in design to the office buildings. In this structure, the columns and beams were not faced but were finished and became a part of the exterior surfaces. The panels are of brick with a row of steel sash next to the ceilings, the exterior thus made being harmonized with the main buildings by the use of small, stucco finished, ornamented rectangles set centrally in the panels. The design which was used consisted of three diamond shaped, terra cotta insets similar to those in the panels of the office units.

The plans for the office buildings units were developed and the construction supervised by the engineering department of the Florida East Coast, H. N. Rodenbaugh, chief engineer at the time the plans were started and now vice-president, W. G. Brown, engineer maintenance of way, H. M. Brown, structural engineer, and H. McCarrel, architect. The contractor building the first two units was W. P. Richardson & Co., Jacksonville, Fla. The contract for the third unit has been let to the W. P. Thurston Company, Richmond, Va.

New Canadian Rate Law

THE new Canadian rate bill, proposed by the government, has become a law. The Progressive (Western agrarians) group tried materially to alter the provisions of the measure but after three days of animated debate the bill was passed by the House of Commons and a few days later by the Senate. The bill directs the Board of Railway Commissioners to fix rates regardless of the Crow's Nest agreement—saving only that the Crow's Nest rates must be retained on grain and flour moving eastward to Port Arthur and Fort William. In all other cases the Board is required to determine and enforce "just and reasonable rates."

This new legislation will bring an end to the Crow's Nest Agreement which came into force in July of last year, after being in the discard for several years, was later suspended and is now again in force. This agreement fixed low maximum rates in the Prairie provinces on lines of the Canadian Pacific which were in operation in 1897 when the agreement was entered into. The Canadian National placed the rates in operation only at competitive points and the C. P. R. did not apply them at points not on its lines in 1897. This brought extensive discrimination between communities. The new law endeavors to avoid this by requiring that the low rates on grain and flour must be applied on all lines.

In general, the political line-up on the bill was as follows: Progressives, for retaining the Crow's Nest rates largely as they stood; Conservatives, to do away with low maximum rates altogether and leave the whole question of rates to the Railway Board; the Liberals (the government party) favored leaving all rates but those on wheat and flour in the Prairie provinces to the Railway Board. It was this last solution which was adopted.

The instructions to the Board of Railway Commissioners take the form of amendments to the Railway Act of 1919 and follow in part:

Notwithstanding the provisions of the powers given to the Board under this Act to fix, determine and enforce just and reasonable rates, and to charge and alter rates as changing conditions or cost of transportation may from time to time require, shall not be

limited or in any manner affected by the provisions of any act of the Parliament of Canada, or by any agreement made or entered into pursuant thereto, whether general in application or special and relating only to any specific railway or railways, and the Board shall not excuse any charge of unjust discrimination, whether practiced against shippers, consignees, or localities, or of undue or unreasonable preference, on the ground that such discrimination or preference is justified or required by any agreement made or entered into by the company: Provided that, notwithstanding anything in this subsection contained, rates on grain and flour shall, on and from the date of the passing of this Act, be governed by the provisions of the agreement made pursuant to chapter five of the statutes of Canada, 1897. But such rates shall apply to all such traffic moving from all points on all lines of railway west of Fort William to Fort William or Port Arthur over all lines of railway now or hereafter constructed by any company subject to the jurisdiction of parliament.

The board shall not excuse any charge of unjust discrimination, whether practiced against shippers, consignees, or localities or of undue or unreasonable preference, respecting rates on grain and flour, governed by the provisions of chapter five of the statutes of Canada, 1897, and by the agreement made or entered into pursuant thereto, within the territory in the immediately preceding subsection referred to, on the ground that such discrimination or preference is justified or required by the said Act or by the agreement made or entered into pursuant thereto.

To remove doubts the tolls specified in tariffs filed, at any time prior to the passing of this Act, with the Board in accordance with the provisions of the Railway Act, 1919, are and shall be deemed lawful tolls notwithstanding the provisions of any Act or any agreement and notwithstanding any judgments or orders made, at any time prior to the passing of this Act, with regard thereto until revised by tariffs filed with the Board pursuant to this Act.

Many leading Parliamentarians spoke during the protracted debate, among them being Premier Mackenzie King; Arthur Meighen, leader of the Conservatives; Sir Henry Drayton, a prominent Conservative and former chairman of the Railway Board; Minister of Railways Graham and Thomas A. Crerar of Winnipeg, a leading Progressive member and a cabinet minister during the war. The last mentioned made the most critical speech on the bill from the Western point of view. At the conclusion of his speech he introduced an amendment proposing the fixing of a new maximum rate for all Prairie traffic, and would provide that any rate fixed by the Railway Board for territory lying west of Fort William and east of the Rocky Mountains should not exceed by more than ten per cent the rate fixed for the same commodities in the territory lying east of Sudbury. This amendment was defeated by a large vote, as were other amendments offered by Robert Forke, leader of the Progressives in the House.

The Prime Minister spoke briefly in the debate in part as follows:

The criticism that has been directed by honorable gentlemen opposite against the government with respect to the legislation before the House has come from diametrically opposite and antagonistic points of view. Gentlemen immediately opposite (Conservatives) have criticized the government on the ground that in the effort to have a policy of equalizing freight rates adopted throughout the country we have not done away entirely with any security to the middle west with respect to the maximum rates on grain and flour, which were a part of the security afforded by the Crow's Nest pass agreement. On the other hand, gentlemen of the Progressive party further to the right have criticized the government, not because we have not done away with this measure of security, but for the reason that we have not restored the Crow's Nest pass agreement in its entirety—and, if I gather correctly, not only the Crow's Nest pass agreement in the application as interpreted by the courts, but the Crow's Nest pass agreement in its application, as discussed before judicial decision had been given by the Supreme Court.

As to retaining the rates on grain and flour, the government has felt that it is dealing with a condition, not a theory. Theoretically, I do not believe it can be disputed that the only basis on which freight rates can properly be fixed is that of allowing to the railway commission an absolutely free hand. That is unquestionably the sound, theoretical position. On the other hand, in the endeavor to make effective that policy the government, as I have said, is confronted with an existing condition—that at the present time and for many years past the middle west has had a certain degree of protection in its maximum rates guaranteed by the Crow's Nest

pass agreement under an act of Parliament passed many years ago. That agreement still continues and is now in force as interpreted by the Supreme court in its recent decision.

The government's policy, as stated over and over again is a policy of equalization of rates. That does not necessarily mean, as I understand it, that as between provinces exactly the same rate per unit, per ton, per mile, shall prevail in regard to all commodities. Enough general knowledge exists of the difficulties of framing rate structures to have every honorable member realize clearly that matters of the kind are technical points that no assembly such as this could begin to pronounce upon. But there is an axiom of Euclid which says that things which are equal to the same thing are equal to one another, and my conception of the policy of equalization of rates is that the railway commission in dealing with a great problem such as this, would see to it, so far as British Columbia is concerned, so far as the prairie provinces and the maritime provinces and Ontario and Quebec are concerned, that a rate structure should be worked out which as respects the different provinces would help to make equal those things in their relation to each other, and help thereby to promote national unity and prosperity in trade and industry throughout Canada.

Contending with the Prime Minister that Parliament should legislate for the whole country and not for any part of it Mr. Meighen, Conservative leader in the House, maintained that the legislation should go farther than that proposed by the government. Mr. Meighen would abolish the whole agreement and all other special pacts so that the Railway Board would have a free hand. He scored the government for not going far enough:

After passage in the House the bill went to the Senate. A similar debate on the measure took place there, the representatives of the various provinces of the Dominion expressing either approval or disapproval of the measure as it proposed either to raise or lower rates, as it appeared to give advantage to one province over another. On Saturday of last week, following an all-day debate, the Senate reported the bill without amendment, and on Monday of this week gave the measure third reading and final passage.

I. C. C. Hears Arguments on Van Sweringen Testimony

WASHINGTON, D. C.

THE Interstate Commerce Commission devoted Wednesday, June 24, to hearing arguments on the question as to whether O. P. Van Sweringen, chairman of the New York, Chicago & St. Louis, should be required to answer questions by opposing counsel, on cross-examination, regarding the stockholders and financial affairs of real estate companies in which the Van Sweringen brothers were interested before they became interested in the railroad companies which they are now seeking to have unified under the control of a new Nickel Plate company. Mr. Van Sweringen had declined to answer such questions on the ground that they involved private affairs not connected with the railroad business, while counsel for the minority stockholders of the Chesapeake & Ohio contend that they are related to the railroad transactions because stock of one of the companies was used as collateral in raising money for the initial payment in connection with the purchase of the Nickel Plate stock from the New York Central, and because some of the companies have contracts with the Cleveland Union Terminals Company for air rights, station concessions and the rental of traction terminal facilities at the Cleveland Union station.

Thomas B. Gay and H. W. Anderson, representing the minority stockholders, insisted on their right to inquire minutely into the affairs of these companies and of persons who are stockholders in them on the ground that they may disclose a concealed interest on the part of the

New York Central in the transactions of the Van Sweringens and also for the purpose of disclosing enormous profits which they said would accrue to the Van Sweringens from the real estate and unification transactions and from their manipulation of the assets of the railroad companies.

Newton D. Baker, counsel for Mr. Van Sweringen, drew a line between the private and the railroad transactions, inviting the commission to send its own examiners to examine all of the papers involved, with the understanding that they should not be made public unless the commission itself decided that they were pertinent to the case, but objecting strenuously to what he termed a "prying" into personal affairs by counsel who themselves represent a private interest. He said that Congress had passed consolidation provisions of the transportation act on the recommendation of the commission that some of the advantages of unification under federal control should be preserved but that if the commission should adopt impracticable procedure for handling applications the present unification application may be the last one and that if there are to be no limits to cross-examination there will be no unifications because the opposing interests will be able to prevent termination of the hearings. He said the record in this case already consists of 3,000 pages, of which 2,000 "have no more to do with the present purpose than Caesar's shroud," and that the counsel who propose to question Mr. Van Sweringen have no more authority to represent the public interest "than Don Quixote in his attacks on the sails of the windmills." He said there had been a minute disclosure of all the relations of the companies which held railroad securities and that the affairs of the Cleveland Union Terminals Company, of which the Nickel Plate owns 7 per cent, the New York Central 71 per cent and the Big Four 22 per cent, had been examined exhaustively by the commission. Mr. Anderson had contended that the C. & O., stockholders were interested in any connection with the terminals company because the new Nickel Plate company has a joint and several liability for the bonds of that company. Mr. Baker said that as long as the other companies are solvent the Nickel Plate's liability is only 7 per cent of any amount by which the value of the property may fall below the amount of the securities.

Mr. Anderson argued that the proposed inquiry is pertinent to show any New York Central interest, to show the withdrawal of railroad assets for use for the benefit of private individuals through the device of collateral corporations, and to show the profits to be made by the Van Sweringens, which he said might well run to 75 to 100 million dollars. He said they had sold government securities in the treasury of the Chesapeake & Ohio and deposited the money at a lower rate of interest in banks and that this was one way to establish private credit. He also said the policy of the Van Sweringens was to get control of a company by issuing in exchange for its stock stock paying a higher return but with the preferred stock deprived of voting power and to maintain control themselves by control of the common stock through the pyramiding of holding companies, and that it would be an easy thing for them to avoid disclosures "by organizing a lot of collateral corporations and mixing up their affairs," if the so-called private corporations are not to be investigated.

The commission decided that the taking of testimony in the case should be suspended until it reaches a decision on the question under argument, except for some direct testimony by Prof. William J. Cunningham of Harvard on June 25.

Claim Agents Hold Annual Meeting

*The handling of personal injury claims and their prevention
considered from several angles*

THE thirty-sixth annual meeting of the Association of Railway Claim Agents was held at the Royal Alexandra hotel, Winnipeg, Man., June 17-19, consideration being given the handling of personal injury claims and their prevention. J. J. Donohue, general claims attorney of the Louisville & Nashville, and president of the Association presided.

Officers elected for the ensuing year were, president, W. H. D'Arcy, general claim agent of the Canadian Pacific, Montreal, Que.; vice-presidents, C. S. Williston, claims attorney of the Pullman Company, Chicago, W. C. Brister, general claim agent of the Reading Company, Philadelphia, Pa., and Robert Irwin, general claim agent of the Atchison, Topeka & Santa Fe, Los Angeles, Cal. H. D. Morris was re-elected secretary and treasurer. The next annual meeting will be held in May, 1926, in Los Angeles, Cal.

F. A. Kelly Defines a Good Settlement

F. A. Kelly, chief claim adjuster of the Atchison, Topeka & Santa Fe, Coast Lines, Los Angeles, Cal., presented a paper on "What Constitutes a good settlement," in which he outlined the duties of the adjuster in bringing about a satisfactory agreement between all parties concerned. The paper in part is as follows:

It may be that we, who are engaged in the settlement of claims for railways, are oftentimes led to term "a good settlement" that settlement by which we gain an advantage over a claimant because of our greater shrewdness or experience. In such a case we ask ourselves, "Is this transaction straight and honorable?" Sharp practices are never defended by our employers. There is one principle which every great teacher of ethics of the ancient world has laid down, which the best and most enlightened of our modern intellects recognize as the ultimate rule of life, the Golden Rule. Let us then, as claim men, apply this rule, and especially let us apply it in dealing with employee cases, which class of claims occupies the greater portion of our time and money paid out. The employees are the hands, the feet, the brains of the railways and if we poison by unfair dealings the mind of one employee, we not only render him incapable of giving his best, but his distrust is communicated throughout the entire system in some degree. Treat claimants amicably. Claimants or their attorneys are often found to be unscrupulous, untruthful and their demands unreasonable, and we, in such cases, are excusable for making use of exceptional methods in dealing with them. We also have to contend with that element of unrest—the constant shifting for advantage in the contest of labor versus capital. I do not believe we are criticized often by our employers for paying too much in the settlement of a claim but we probably have been censured for not paying enough. What is *enough*? In other words, what is a good settlement?

Let us leave the moral side of this question and consider the legal phase of it. I am not asked to discuss what constitutes a good release. My subject is broader. It is possible for one to obtain a legally good and sufficient release and yet fail in making a good settlement, but it is not possible, in the full meaning of the term, to

make a good settlement and fail to secure a good release. To impeach the integrity of the written release successfully a plaintiff must, by the most cogent and convincing facts and circumstances establish fraud, such as undue advantage, combined with weakness of mind or body, or confidence abused, or that releasor could not read the language in which the instrument was written, or that for some other reason he could not read.

It will be seen, therefore, that from either point, moral or legal, we get very much the same view—that a "release" is only "good," that a "settlement" is only "good," when it is founded upon conscionable, just dealings. A "good settlement" is one giving a complete cessation from commotion, according to Webster's definition. Therefore when we can so settle all claims that when once consummated we can ever after sit in peace and no commotion will be caused either by the claimant or our employers we will indeed be making "good settlements."

Facts Essential to a Proper Investigation

In a paper on "The analysis of facts essential to a proper investigation," Arthur Stimple, district claim agent of the Chicago & North Western, Chicago, described the essential characteristics of a successful investigator and the facts which should be developed in the investigation. His paper in part is as follows:

A successful investigator must have many qualifications but the most essential ones are personality, initiative, imagination, visualization and the ability to solve his problems by analysis. He must realize that it is disconcerting to his superiors and to the legal department to have files passed to them with the investigation in a partly completed condition, with glaring discrepancies in the statements of witnesses or obviously important facts not developed. A careful analysis at several stages and at the completion of his investigation will reveal these discrepancies or omissions, give him an opportunity to correct or supply them and enable him to experience the satisfaction that comes with the knowledge of work well done.

Imagination, visualization and analysis are perhaps the most essential qualifications of the successful investigator. Imagination enables him to visualize and visualization enables him to construct a mental picture of the accident. Analysis as the investigation progresses enables him to detect any inconsistencies or imperfections in the picture and to remedy them.

Nothing is more important in claim work than analysis and there is no stage in the course of a claim from the occurrence of the accident until settlement is negotiated or it is otherwise disposed of that analysis is not brought into play. The uninterrupted course of analysis embraces the analysis of reports, of conditions, of the statements of witnesses, of claimants, of motives, incentives, facts, evidence, character, human nature and of cause and effect.

The parts of an investigation are the facts developed and the trained investigator with an orderly mind will arrange his facts as they are developed in such orderly array that analysis at all times will not only be possible, but easy and automatic. An investigation may be likened

to a building and the work of an investigator to that of a builder. The builder is provided with a set of plans. Each sheet describes a room or a unit and the final sheet shows the finished structure. In an investigation the sheets are the statements, reports, sketches and photographs and the final sheet is the completed report which embraces the entire structure. If he has builded well the structure will stand the closest inspection and he will not fail to receive the inspector's O. K.

One of the most important types of accidents with which the investigator has to deal is the highway crossing accident. This is also the most numerous of the important accidents. As these accidents usually occur at points remote from the office the first notice is a telegraphic report containing a few brief essential facts. These facts, however, are usually sufficient to enable the investigator, after a few moments spent in analyzing them, to classify the accident and plan his investigation in an orderly fashion. Thus starts the process of analysis which will be followed throughout the investigation. The enginemen are usually the most important witnesses to this type of accident. If the facts in their statements are set forth in orderly fashion and in proper sequence the process of analysis is easy, in fact automatic. It is the practice of many successful investigators to start with the origin of the train at a division point, show its leaving time, engine and makeup, result of brake tests, if made, action of the brakes at the several subsequent stops, and bring it to the place of accident, showing its speed, positions of the enginemen approaching the crossing, warnings given, relative positions of the engine and automobile, what efforts were made by them and by the driver of the auto to avoid a collision, and what resulted. With the facts in all statements thus arranged in proper sequence discrepancies cannot escape detection and can be corrected as soon as they occur. Analysis is not only possible at any stage of the investigation but an analysis of the completed investigation will enable the investigator to preface his report with a statement of the facts. The principles of analysis may be applied to all forms of accidents except hernia cases. To these no rule seems to apply.

G. F. Collette Also Speaks Upon Analysis

G. F. Collette, regional claim agent of the Erie, Cleveland, Ohio, in discussing this question considered the subject from the general office viewpoint. His discussion in part is as follows:

In the general office we analyze the finished file from two angles, (1) with regard to the circumstances attending an accident, and (2) as relating to the company's liability. A number of essentials should be carefully observed in the preparation, arrangement and completion of an investigation. They are, (1) relevancy, (2) continuity, (3) clarity, (4) brevity, and (5) thoroughness.

Obscure and irrelevant matters should be strictly avoided. The facts to be developed are those which may be required to be known by the attorneys who have to pass upon the question of the company's liability, and if need be, try the case in court, and an ordinarily competent and experienced investigator knows just what such facts consist of.

I think that it should be particularly borne in mind by an investigator, that what determines the question of liability, are the facts preceding an accident, and not those that follow, except in very rare cases. Those facts should be limited to the time immediately preceding the occurrence and not to those happening a considerable time before. Unless they may be of use in assisting to

prove what transpired at the time of the accident or just before a collision, such as stating when the bell was started ringing on the engine, or when the whistle was sounded for this or some nearby highway crossing, or when the engine headlight was lit.

It is of equal importance that the enginemen be given a proper understanding of the distance from the crossing to the point at which the warning whistle was sounded, and that such information be embodied in their statements.

A not infrequent omission on the part of the investigator, is complete information regarding persons other than the enginemen themselves, who may have been riding on the engine at the time of the collision. Unless it is so stated, one analyzing an investigation file, is left to wonder whether or not there may have been a third or fourth person on the engine—a green fireman learning the road, perhaps, or the road foreman of engines or some other officer. Similar trouble is experienced in connection with passengers in an automobile struck by an engine or train. Facts or information to be developed by an investigator ordinarily uncover themselves as he progresses, though we often find in supposedly completed investigation files, what appear to be neglected cues or leads, and the utter absence of any sign that an effort had been made to follow them up.

The analysis of facts essential to a proper investigation, of course, depends entirely upon the nature of the accident involved, and it seems that the most important time at which an analysis can be made, is when the investigation is completed, when the accident can be considered as a body, and not in many separate possible parts, as it must appear in its early aspect. It is only when completed that the deficiencies and inconsistencies of an investigation make their appearance, and show themselves. It is important that the investigator analyze the situation with which he is confronted, at the earliest moment possible after he gets started, but not too soon, lest he be misled, and goes ahead at a wrong angle.

F. D. Perry Urges Honesty as a Means of Securing Confidence of Claimants

The subject of holding cases for settlement direct with claimant as presented by F. D. Perry, claim agent of the Chicago, Burlington & Quincy, Chicago, emphasized honesty in securing the confidence of the claimant, and warned claim men against the actions of the ambulance chaser. His paper in part is as follows:

The claim man must be honest at all times; no matter what he is asked by the claimant, he must give him an honest answer. He must first be honest to himself, second, honest to the company which he represents, and third, honest to the claimant. In this way he will always gain the confidence of the claimant and the other railroad men with whom he comes in contact will spread the word that he is honest with the men and they will not only come to him to make their settlements, but will advise him of other men who are dishonest or making dishonest claims.

The claim agent must be very careful when he first approaches a man after he has been injured and should immediately endeavor to gain the claimant's confidence. He should not immediately try to take his signed statement as to how the accident happened. After the claim agent has the man's confidence and has told him that the company is going to do all it can for him it is easier to get his statement than it would have been immediately after the accident.

Mr. Perry also spoke upon the tactics of ambulance

chasers and the methods to be employed in counteracting their effect. He urged claim men to warn claimants against promises made by ambulance chasers and to check back on employees of hospitals to ascertain if any of them are working with any of the lawyers or ambulance chasers.

Investigation of Antecedent Disease

C. S. Williston, claims attorney of the Pullman Company, spoke upon "Antecedent disease or latent diseased condition as a factor in determining damages both at common law and before compensation boards, when the doctrine of exciting cause is applied, and how best to meet the situation." He urged a more careful investigation and a closer analysis of facts and cited many conditions which arise in the treatment of claims due to such causes. His paper in part is as follows:

No claims require more careful investigation and closer analysis of facts, both involving the cause for the complaint, and the damages claimed, than those in which there is the element of a disease, either latent or active at the time of the injury. The question before us for discussion is how to meet the situation, while the case is still being handled in form of a claim. What are the conditions with which we are met?

It seems throughout the general line of adjudications that the rule is laid down that in case of a latent disease, the negligent person is liable for all of the damages which the injured person may suffer, although such damages are larger than would have been suffered by a person not so diseased. There are, however, some decisions drawing a distinction between a latent and an active condition of disease, the line of demarcation seeming to be that when the latent condition obtains, it may be assumed that such latent condition will continue indefinitely, and that but for the accident or trauma, the person would have suffered no particular ill effects. When an accidental injury occurs, it is argued that a new condition presents itself, for which condition the party at fault should be responsible for all damages resulting therefrom, even though aggravated by reason of the weakened physical condition of the injured person, or by the fact that latent disease has been lighted up and becomes active.

On the other hand when an active condition exists at the time of the accident, only the effect of the accident, disassociated from the disease, should be considered. Where there is an active condition of disease in existence at the time, wherever there are indications of an active disease at the time of the accident, then the case should be handled on the basis of the effect of the accident alone, as it is not fair that the defendant should pay for the defective condition existing at the time of the accident and results which would necessarily flow from such diseased or sick condition. It will be a very strong weapon in the hands of the defense in each case to be able to prove the active diseased or defective condition. Some courts have allowed the question of expectancy of the injured person to be introduced before the jury, although some courts have declared such evidence to be incompetent. Also it has been held that the question of actual damages suffered is a subject for expert testimony, and the more the case can be broken up so as to present these features, the better. Again, courts have shown willingness to apply the ordinary rules applicable to ascertainment of damages, such as are applied in the various classes of cases. Perseverance and ingenuity will often develop defenses along these lines.

It is thus apparent that it is very necessary to develop all the facts of the diseased condition of the claimant.

The principles of law above set forth furnish great opportunity for frauds to be perpetrated and for the success of malingerers. In investigations of this class of cases, it is very essential that one should work very closely in co-operation with the surgeon for the company, and that he be consulted with from time to time, as the investigation proceeds. After all, the investigation must necessarily largely be one involving medical history, and medical theories, both of diagnosis and prognosis. In any case, where the results claimed would seem to be out of proportion to the injury suffered, the investigator should promptly determine whether he is dealing with a case of latent disease or with a diseased condition which can be treated by skillful claimants and attorneys as a latent diseased condition, so as to bring the case within the general principles governing cases of that nature. Many cases can be controlled or minimized from a claim standpoint by conscientious effort and exhaustive investigation. To this end, all facts with regard to the physical condition of the claimant prior to the accident, diseases suffered by him, all treatments received and the names of all physicians who have rendered services to the claimant for a number of years past should be secured, and interviews should be had with the various physicians in the vicinity, as oftentimes valuable information can be secured, particularly with regard to malingerers. The latest approved physical tests should be applied to claimants, if permission can be secured. By such thorough means, oftentimes defenses can be developed which, in the first instance, would not be apparent. Likewise facts and theories which properly constitute such a defense in court will provide arguments to appeal to the better nature and judgment of the claimants, their physicians and attorneys, this while the matter is still in the claim stage. In case of death occurring, assistance is often secured by the form of the death certificate. This is one of the first things to be obtained in any investigation involving death. The attending physician will be found to be on record and will be more easily held in line.

How Claim Agents Can Improve

C. H. McKinney, district claim agent of the Louisville & Nashville, Knoxville, Tenn., spoke on "What can we as field men do to advance ourselves in our profession as claim agents?" He suggested that claim men extend their knowledge of the subject, understand the people with whom they come in contact, and learn the territory to which they are assigned. His paper in part is as follows:

I will mention some of the methods, as I see them, in connection with a few of the essential qualities of a claim man, our improvement in which will very materially enhance our standing and usefulness in the profession:

Getting the necessary knowledge of the business, which needs no elaboration, and in which I include at least the rudiments of a legal education. It is not absolutely necessary to be a lawyer in order to be a good claim agent, for some of the best claim men I have known were not lawyers; but it goes without saying that a man's chances for success are much greater if he does have a legal education. A certain amount of legal knowledge is essential to the proper performance of the duties of a claim agent.

It is well to investigate each accident with an eye to possible litigation, and a man must, therefore, have a reasonable idea of what will be needed in that event, in order to do his work efficiently and well. A working knowledge of these branches of the law can be acquired in a reasonable length of time and will more than repay the effort; not only in increased efficiency and better

service, but in the satisfaction of knowing that you are better able to cope with the difficult situations with which a claim agent is so frequently confronted.

Resolve to become a better and more efficient claim man by thoroughly learning your territory, mastering the details of the work from a practical standpoint, getting acquainted with the people with whom you have to deal, etc. There is really nothing like knowing your people, and you will find a knowledge gained from special effort along this line will bridge you over many a turbid stream.

The claim agent, of course, hustles in doing his work—he has to—but he should make it a point to use his head as well as his feet. Thinking is frequently better than hustling, but the two work wonderfully well together. Remember that an ounce of intelligent getting ready is worth a pound of fussing. The reason I say thinking often beats hustling is that, while there is nothing better than keeping everlastingly at it, there is some humbug to that, because if you are doing a thing wrong the more you push it and the harder you keep after it, the worse off you are in the long run. "Be sure you are right, then go ahead", is a good rule to follow. Nine-tenths of efficiency is preparedness. Make up your mind to do just a little better than other men; for, after all, a genius is nothing but a man who can do at least one thing better than the other fellow.

Another thought is that faith and work—just plain hard work, will advance our interests about as much as anything else. In fact, there is nothing to take their place, and it is well to remember that "There is no excellence without great labor." We must have faith;—faith in ourselves, faith in our fellow-man, faith in our companies, and faith in the justice of our cause. Not just ordinary belief, but we should, in the language of the great apostle, "Put on the whole armor of faith," remembering also that "Faith without work is dead."

Grade Crossing Committee

Reports Progress

The Grade Crossing Committee of the Association of Railway Claim Agents reported progress in the prevention of highway crossing accidents during the year 1924. The Interstate Commerce Commission in its report of highway crossing casualties for the year 1924 showed a total of 2,149 fatal accidents and 6,525 injuries. This was an actual reduction over the previous year of 119 less persons killed, a decrease of 5.2 per cent. There were 211 more persons injured, an increase of 3.3 per cent. The registration of automobiles as of December 31, 1924, showed an increase of 17 per cent and reached approximately 17,700,000. In 1921 there was one crossing casualty to every 4,397 motor vehicles registered, in 1922 one casualty to 4,646, in 1923, one casualty to 5,029, while in 1924 there was one casualty to 6,043. During the four summer months of the year, there was an actual reduction of 139 death cases over the preceding year. In January, 1925, there were 30 less fatal and 37 less injury casualties than in 1924.

The Safety Section of the American Railway Association has inaugurated its fourth summer campaign against crossing accidents and the claim departments can be of substantial assistance in the prevention of crossing accidents by a persistent insistence that the statutory warnings be given by engine crews, that mechanical crossing warning devices be maintained in first class order, that employees charged with the duty of guarding crossings be fully trained in their duties, kept alert and active at all times and held to a strict accountability for

damage or injuries at their crossings. Claim department investigations that indicate any laxity in the performance of duty by an employee directly or partially involved in the mishap, should be promptly brought to the attention of the proper supervising officer, to avoid repetition of mishap and to advise the employees that we are constantly on the job and determined that the number of crossing accidents must be brought to a minimum.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT car loading for the week ended June 13 totaled 987,196 cars, an increase of 84,604 cars as compared with the corresponding week of last year, but a decrease of 21,642 cars as compared with 1923. Loading declined 7,678 cars from the total of the previous week, due to slight decreases in loading of all commodities except coal and miscellaneous freight. The loading of grain and grain products and of live stock was lighter than in the corresponding week of last year and all commodities, with the exception of grain, miscellaneous freight and l.c.l., were lower than in 1923.

REVENUE FREIGHT CAR LOADING

Week Ended Saturday, June 13, 1925.

Districts	1925	1924	1923
Eastern	236,146	214,944	252,310
Allegheny	201,198	184,579	226,807
Pocahontas	50,615	38,235	41,928
Southern	139,956	126,104	132,317
Northwestern	150,800	146,269	168,542
Central Western	142,002	136,321	132,909
Southwestern	66,479	56,140	54,025
Total Western	359,281	338,730	355,476
Commodities			
Grain and grain products	35,570	37,713	33,914
Live stock	25,997	29,634	27,901
Coal	157,559	138,240	186,955
Coke	9,217	7,554	15,185
Forest products	73,505	69,053	78,067
Ore	61,323	60,115	79,335
Mdse., l. c. l.	256,682	241,657	243,518
Miscellaneous	367,343	318,626	343,963
Total	987,196	902,592	1,008,838
June 6	994,874	910,793	1,012,312
May 30	920,514	820,551	932,684
May 23	986,209	918,224	1,015,532
May 16	984,916	913,201	992,319
Cumulative total, twenty-four weeks	22,323,687	21,373,355	21,979,049

The freight car surplus for the period June 1 to 7 averaged 318,805 cars, including 125,785 coal cars and 143,800 box cars. For the same period the Canadian roads had a surplus of 36,110 cars, including 32,500 box cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended June 13 aggregated 49,963 cars which showed a slight increase over the previous week and a decrease of 7,898 cars from the same week last year. The large decreases from last year were 4,412 cars of grain, 3,213 cars of coal and 444 cars of pulpwood, gains being made in lumber, 268 cars, and in merchandise, 218 cars. The principal changes from the previous week were increases of 458 cars in grain and 340 cars in merchandise and a decrease of 345 cars in ore.

Commodities	Total for Canada			Cumulative Totals to date	
	June 13, 1925	June 6, 1925	June 14, 1924	1925	1924
Grain and grain products	4,726	4,268	9,138	141,545	197,563
Live stock	2,043	1,965	2,022	52,531	52,164
Coal	1,737	1,688	4,950	89,837	115,391
Coke	138	222	251	6,818	5,828
Lumber	4,274	4,352	4,006	79,499	85,309
Pulp wood	1,987	2,074	2,431	75,496	78,238
Pulp and paper	1,972	2,010	1,985	50,008	49,785
Other forest products	2,588	2,639	2,347	71,246	67,686
Ore	1,316	1,661	1,602	29,901	26,609
Merchandise, L. C. L.	15,972	15,632	15,754	354,721	332,596
Miscellaneous	13,210	13,209	13,375	264,704	267,923
Total cars loaded	49,963	49,720	57,861	1,216,306	1,279,092
Total cars received from connections	31,258	30,842	29,093	791,298	798,173

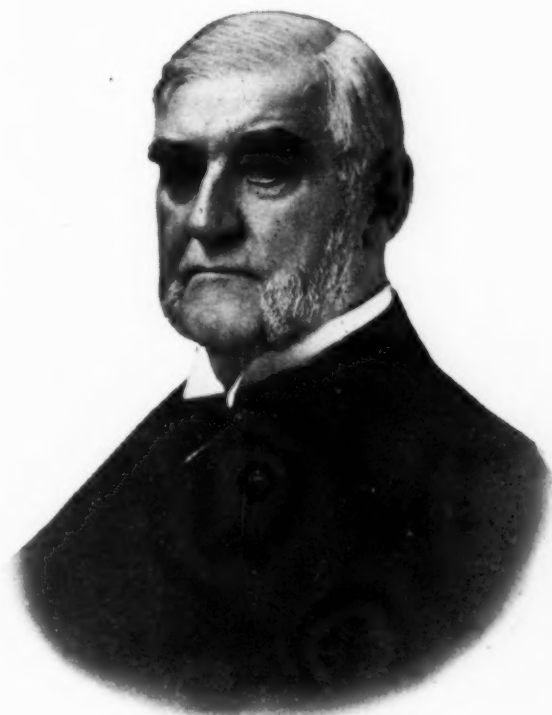
Hughitt and Finley Retire

Chairman and president of the North Western relinquish duties—Fred W. Sargent elected president

MARVIN HUGHITT, SR., chairman of the board of directors of the Chicago & North Western and one of the few remaining railway pioneers, announced his retirement from active service at the meeting of the directors in New York on June 23. He was elected chairman of the finance committee instead, so that his connection with the North Western, while less active, will continue. W. H. Finley, president, also resigned on account of ill health. Fred W. Sargent, vice-president and general counsel, was elected president to succeed Mr.

When he was elected president of the North Western in 1887 its mileage and that of its subsidiary properties totalled 4,210 miles. As president, he directed the remainder of the expansion of the road and established it firmly in the cities which it serves. After his election as chairman of the board in 1910, Mr. Hughitt did not relinquish his active control over the North Western but continued to administer its affairs to an extent which, in a chairman, was extraordinary.

Mr. Hughitt has been conservative in his administra-



Marvin Hughitt



W. H. Finley

Finley. The position of chairman of the board was abolished.

Mr. Hughitt's retirement from active service marks the end of a long and honorable administration of a great railroad. He is one of the oldest men in railway service today, yet in spite of his years he has held up under the load as few younger men could have done. For nearly 50 years Mr. Hughitt has been in active charge of the affairs of the North Western and in that time he has seen it grow from a railway of less than 2,000 miles to the present system of over 10,000 miles of line. He has been personally responsible for most of that growth.

When he became general manager in 1876, the effects of the financial panic of 1873 were still being felt and the North Western's earnings were at a low ebb. Under Mr. Hughitt's direction this problem was successfully met and the foundations of future success were laid. The construction of new lines was begun again and the North Western expanded as fast as before.

tion of the North Western. He has been slow to undertake expensive grade reduction programs; neither has he pioneered in the adoption of large locomotives. Rather he has adhered in his allegiance to that school of railroad-ing that has believed in running shorter trains and running them faster as productive of the best service for patrons.

However, under Mr. Hughitt's leadership the North Western has never been backward in establishing itself in the territory it serves. Rather it has today in the larger cities it enters terminals which are the envy of other roads. While, unlike the St. Paul, the North Western has not extended its lines far into territories beyond its own domain, it covers its own country thoroughly. It is provided with facilities well abreast of its traffic with a large mileage of double track and four track lines, adequate freight stations, etc.

Mr. Hughitt's greatest desire for the North Western has been to provide the best service possible for its patrons

and it has long been popular with them. His motto has been "service." An example of his success in this respect is to be found in the passenger service of the North Western, which has long been noted for its excellence. North Western passenger trains, particularly the Overland Limited, operated in conjunction with the Union Pacific, the North Western Limited and others of equal fame, rank among the best in the country.

Of late, however, there have been increasingly pressing demands for a change in the operating methods of the North Western. It has been felt that a younger, more aggressive administration might have been better able to cope with the problems of a very modern nature which the North Western, with its neighbor roads in the northwest, has faced. It is a question whether this might have been true. The difficulties in the northwest are fundamental, concerning transportation in general rather than



F. W. Sargent

any one railroad. The essential factors of difficulty have been a low rate structure, a lack of sufficient prosperity in a large part of the territory to produce traffic, and the claim that operating costs in the northwest have increased out of proportion to those in other sections of the country. So there is a question whether any other administration might have done better in the handling of the problems than has Mr. Hughitt. Certainly it cannot be questioned that the present magnitude and excellent strategic position of the North Western were attained under his long and capable administration.

Mr. Hughitt was born on August 9, 1837, in Genoa, N. Y., and entered railway service in 1856 as superintendent of telegraph and trainmaster of the St. Louis, Alton & Chicago, now a part of the Chicago & Alton. In 1862 he was appointed division superintendent of the Illinois Central and two years later was promoted to general superintendent. After serving for one year, from 1870 to 1871, as assistant general manager of the Chicago, Milwaukee & St. Paul, Mr. Hughitt was appointed general manager of the Pullman Palace Car Company, now the Pullman Company. His service with the Chicago & North

Western began in 1872 when he was appointed general superintendent. Four years later he was promoted to general manager and in 1880 was promoted to vice-president and general manager. Mr. Hughitt was elected president in 1887 and served in that capacity for 23 years, until October, 1910, when he was elected chairman of the board of directors. Prior to 1907 he had also been elected president of the Chicago, St. Paul, Minneapolis & Omaha, a subsidiary of the Chicago & North Western, of which company he was made chairman of the executive committee in 1907. Mr. Hughitt's retirement and appointment to the finance committee chairmanship ended his 25 years of service as chairman of the North Western.

Mr. Finley has been an important aid to Mr. Hughitt since 1913, when he was made chief engineer of the North Western. While Mr. Hughitt's active administration as chairman of the board has relieved Mr. Finley of a portion of the responsibilities ordinarily carried by a president of a large railway, he has been an important factor in carrying out the Hughitt policies in establishing the position of the North Western as a great railroad. Mr. Finley's years as president of the North Western have been unusually trying ones. He has had to contend with extraordinary difficulties during the readjustment period following the war and it is distinctly to his credit that the road has been able to keep its head above water in spite of all its troubles.

Mr. Finley was born on January 22, 1862, in New Castle county, Del., and was educated in the public schools and by private instruction. He entered railway service in October, 1887, as a draftsman on the Chicago, Milwaukee & St. Paul. Four years later he was promoted to assistant engineer and placed in charge of designing in the bridge and building department. Mr. Finley entered the service of the Chicago & North Western in 1892 as engineer of bridges, which position he held for 10 years. In 1902 he was promoted to principal assistant engineer and four years later to assistant chief engineer. He was promoted to chief engineer in 1913 and was elected president of the corporation in 1918, assuming the active presidency of the property at the end of federal control.

As Mr. Hughitt represents the past generation in American railroading, so Mr. Sargent represents the present and the future. He is a relatively young man, only 49 years of age, and is one of an increasing number of legal officers who are coming more and more into prominence in railway affairs. Without experience in practical railway operation, he has nevertheless become a leading figure in the working out of the problems of the economics of transportation. He has been particularly active in recent months in the campaign for higher freight rates which is being pushed by the western roads, the North Western having been one of the principal sufferers from low earnings. As president of the North Western Mr. Sargent will leave the details of operation to a large extent to his other officers, devoting his own energy for the most part to the broader problems of transportation agencies. The ability and resource which he has displayed in his meteoric rise to prominence in the railway field during the past four years will serve him well.

Mr. Sargent was born on May 26, 1876, at Akron, Iowa, and graduated from the University of Iowa in 1901. After engaging for several years in the private practice of law, he entered railway service in 1906 in the legal department of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha. He left the North Western in 1912 to become attorney for the state of Iowa for the Chicago, Rock Island & Pacific, which position he held until 1921, when he returned to the North Western as general solicitor, with headquarters at Chicago. Mr. Sargent was elected vice-president and general counsel in December, 1923, and held that position until his recent election as president of the North Western.

Superintendents' Meeting Concluded

Interesting topics include yard operation; car distribution; fuel economy and operating rule changes

THE closing sessions of the convention of the American Association of Railroad Superintendents in Richmond, Va., on June 18 and 19 (the proceedings of the first two days of which were included in the *Railway Age* of last week), were marked by the discussion of a number of interesting questions of operating practice. One decision of particular interest was to refer the whole question of motor truck use to a special committee for extended consideration. Two features of the last days of the convention were papers read by M. J. Gormley, chairman of the Car Service Division, American Railway Association, and by E. T. Horn, chief of

yard and terminal operation of the Baltimore & Ohio. A visit to the plant of the American Locomotive Company was made on Thursday and on Friday the members inspected the Hampton Roads harbor at Newport News.

Adjournment of the convention occurred at noon on Friday following the election of officers. In addition to the officers whose election was announced in last week's issue of the *Railway Age*, George J. Shreeve, general superintendent, Belt Railway of Chicago, was elected to the newly created position of third vice-president. Montreal, Que., was selected as the place for the 1926 convention.

Nationwide Distribution of Cars

An address on nationwide distribution of cars was delivered by M. J. Gormley, chairman, Car Service Division, American Railway Association, on Thursday. It is abstracted below.

To get a picture of the magnitude of car distribution we should take into consideration the total number of cars owned, the total number of cars loaded yearly, the relative location of production of principal commodities, and the relation of density of population to production. Railroads and private car lines that are controlled by railroads now own 2,435,556 freight cars, as compared with an ownership of 2,384,134 cars in 1924 and 2,373,576 cars in 1923. There were loaded during the year 1923—49,812,113 carloads of freight and in 1924—48,527,227 carloads, both years exceeding in volume the loading of any previous years. With this volume of traffic you can realize that the problem of redistribution of equipment from the consuming to the producing territories must be done under rules that are automatic in their operation and under which the cars can be moved continuously and without waiting for specific orders.

One of the principal problems we have to meet every year is the movement of the western grain crop, and one of the most important of the car service rules in the handling of this grain is Junction Rule 2, which requires that cars delivered to a connection for unloading at the junction point must be returned empty to the delivering line. This rule was carried out pretty close to one hundred per cent in 1924 and was one of the very important factors contributing to the satisfactory movement of grain during that year. You realize that a failure of the line on which the grain is unloaded at a terminal to return the empty car promptly to the line bringing the grain into the terminal would very shortly result in the grain cars being scattered and used in other traffic not requiring that high class of car, thereby causing a car shortage and depriving the farmers of the cars necessary to handle their products to the markets.

A very considerable proportion of the products of agriculture of the west and south must be consumed in the densely populated territory of the east, in which district are located 72.6 per cent of the manufacturing establishments, as judged by the capitalization thereof.

This also indicates that the great problem in the matter of car distribution is to secure a return from this densely

populated eastern territory to the southern and western districts, of the cars arriving with products of the west and south, for the reason that the westbound and southbound traffic from this eastern territory is not of sufficient volume to return loaded to the west and south all of the cars that are required for the movement of traffic from these large agricultural producing sections.

A very large proportion of the production of fruits and vegetables comes from the Pacific coast states, Florida and other states bordering on the gulf, involving the movement of empty refrigerator cars very great distances. The great problem of the railroads is to handle the refrigerator equipment so as to insure its return to the producing territories in sufficient volume during times of peak production to prevent a car shortage. This involves the moving of empty refrigerator cars long distances to the extreme west and south, where there is the heaviest production of fruits and vegetables.

The receiver plays a very great part in this supply of refrigerator equipment and no greater work can be done by the superintendents and their staffs in providing adequate equipment than by impressing upon receivers the necessity for the prompt unloading of refrigerator equipment.

The improved co-operation between the shippers and the railroads is in no small way responsible for the improved car supply from 1923 to date, in that shippers have seen more clearly the problem of the railroads in car distribution, have interested themselves in more prompt loading and unloading of equipment, and have been of very great assistance to the railroads in the observance of the car service rules by endeavoring to load cars to or in the direction of the owners. The receivers of traffic in the consuming territory of the east have come to realize that they have a responsibility to the shipper in the west and the south, and we believe they are actually doing what they can to avoid delay to equipment and to load it in accordance with the car service rules.

There is no question whatever that the best method of car distribution is the movement of equipment under the car service rules if they are carried out. They have been carried out since 1923, and under their operation the largest traffic that was ever moved by the railroads has been handled without car shortage.

We commend to the superintendents the importance of

the carrying out of the car service rules, and their continued and hearty support of the work of the regional advisory boards, in an endeavor to further extend co-

operation between the shippers and receivers of freight and the railroads, all of which is in the interest of better car distribution.

Distribution of Freight Cars

A report on means of improving the distribution of freight cars was made by a committee of which C. E. Brower, general superintendent transportation, Atlanta, Birmingham & Atlantic, is chairman. The report is abstracted below.

The responsibility and authority for car distribution should be placed solely with the superintendent of transportation or superintendent of car service, who in fact is the system car distributor. Upon each division or district there should be a car distributor charged with the responsibility and authority of handling the equipment under his jurisdiction. It is essential that the system car distributor receive a consolidated (or brief) telegraphic car report for each division each day and that he, like the division or district car distributor, have knowledge of the heaviest loading stations, class of cars required, approximate destination and routing of shipments. It frequently happens that a particular class and ownership of equipment is released on one division, for which there is no immediate loading which will take the cars into home territory, but where such loading is obtainable on other divisions of the system, and by empty movement against the current of traffic such cars may be transferred to the other division and given proper loading, thereby avoiding empty haul in the direction of a heavy traffic. Too close relationship cannot be maintained between the system car distributor and the division or district car distributor.

In order to improve the distribution of freight cars or to obtain efficient car service, each division or district must be organized with that end in view and the system also organized with the same objective. On a division or district the superintendent or his assistant naturally becomes the head of the car service organization, regardless of the man on his staff who handles the direct execution of car service orders. The objective will be obtained just to the extent that the superintendent injects his personality into the car service work. Usually the actual hub or source of car distribution and movement orders will be the division or district car distributor, dependent upon the volume of work involved, and the superintendent should not miss an opportunity to talk with this important staff member, checking him up when necessary or encouraging him in his work. Superintendents, trainmasters, yardmasters and agents should be impressed at staff meetings and at other times when occasions arise with the fact that the superintendent is per-

sonally interested in the work of the car distributor and that they must see that his instructions are complied with. Otherwise we obtain a situation of men actually carrying out the car distributor's orders in a perfunctory way without the interest and feeling of responsibility that exists when it is known that the superintendent is behind his orders. In brief, car distribution on a division is as good as the superintendent makes it.

Essential to efficient car handling on a division is an accurate knowledge of the cars located on that division, which information should be obtained through the means of a daily telegraphic car report. This report should be made as of the same hour each day and should account for 90 to 95 per cent of the cars actually on hand and in transit. It is essential that in addition to this report the car distributor obtain a weekly estimate of car requirements from agents at important loading points, such information to show the prospective shipping, kinds of cars required and probable destination and route. With this information the car distributor should undertake to provide for sufficient cars in advance of loading requirements, of particular ownership and kind, with the advantage of getting many of the cars at the loading stations or immediate vicinity under loading.

The two important essentials to efficient car handling are (1) avoidance as far as possible of empty car miles in getting cars into position for loading; and (2) cars of particular ownership to avoid the possibility of empty car miles in the disposition of such cars to avoid per diem.

No opportunity should be lost to advertise the importance of car handling to the employees. This can be done through the medium of circulars or weekly bulletins, such being prepared by the car distributor through the assistance of interested agents, yardmasters and local conductors.

It is a human desire to win a contest, regardless of whether it be voluntary or involuntary. By arranging such contests between divisions of the system, much interest in activities can be gained on the part of the employees. Set a definite goal figure of the average miles per car per day for each division, and the average net ton miles per car per day, and stimulate the performance on each division through the distribution of weekly circulars or bulletins showing the standing of each division and the percentage of its progress toward the goal.

The report was adopted without discussion.

Classification of Through Freight Trains

E. T. Horn, chief of yard and terminal operations, Baltimore & Ohio, read a paper on "Proper classification of freight trains to secure efficient and economical operation and to avoid intermediate and terminal switching." It is abstracted below.

The beginning and end of success in the operation of a railroad, large or small, is the yard, and when the yard is properly planned, manned, operated and supervised, the corner stone has been provided for comprehensive terminal operation and successful freight train classification.

The plans and practices necessary to establish such operation were given opportunity for a thorough and practical test when the Baltimore & Ohio authorized the reorganization of all its yards and terminals. This involved startling changes in operating policies with respect to the control and management of yards and terminals. The first step in this reorganization was the creation of a department with full control of all yards and terminals, including the promotion, demotion or transfer of those charged with the duty of direction or supervision. Under this arrangement all concerned and those connected with

the department became fully advised of the rules and regulations covering terminal operation through which united efforts were assured and secured.

The prime requisites for the best results are system and order; proceeding upon that plan, working books for all train yards and joint train and industrial yards were prepared and placed in the hands of employees and officers affected. These working books contain the official yard and terminal organization, track classification, the assignment and schedules of yard crews as well as the designation of the work to be performed by each crew, the yardmasters' combination classification and turnover reports, a system of forms for reporting daily the intricacies in operation of all yards and schedules of terminal transfer trains and their work reports.

Unlike the practice followed in the past where classification had been attempted, when it was established on the Baltimore & Ohio it was not confined to live stock, perishable and through high class merchandise, but was placed over everything handled by freight trains, local as well as through trains, and was not limited to loads but included empty equipment. When we inaugurated the classification system we had one that insured prompt dispatchment and continuous movement through to destination of live stock, perishable and fast freight, expedite or time freight, ordinary or slow freight, solid trains of empty roof top equipment, solid trains of coal and coke to tidewater, solid trains of empty coal and coke equipment from the piers at tidewater to distributing points in the coal and coke fields, solid trains of coal from the mines to the lakes, solid trains of empty coal equipment from lake points to distributing points in the coal fields, solid trains of ore from the lakes to the ore consuming districts, solid trains of limestone and dolomite

from the quarries to the furnace districts and solid trains of steel from the mill districts to eastern and western destinations.

The solid trains transporting these various classifications of freight traffic are designated as "maintrackers." The definition of a "maintracker" is, "A train that is made up and dispatched from a yard or terminal for continuous movement to destination, or to a breaking up yard, and in its movement having to pass through intermediate yards or terminals." Under this plan many maintrackers are continuous for distances ranging from 160 to 900 miles without break up, while some of them stop at intermediate yards for the purpose of consolidation or for putting on short head or rear ends.

On the Baltimore & Ohio results are shown in quick dispatchment, early deliveries, uncongested yards and striking economies; they are shown, too, in improved operation by the elimination of unnecessary switching and expense; they insure prompt and continuous movement not only of high class but of all classes of freight traffic and empty equipment; they prove a valuable aid to the traffic department in the solicitation of traffic by equipping them with the lever of dependable service; they reduce freight claims and increase the efficiency and usefulness of employees, and contribute to the success of the company by the economies incident to such improvements.

Other substantial benefits now accruing to the Baltimore & Ohio through the adoption and enforcement of system, divisional and through classification are increased engine miles per locomotive per day, increased car miles per car per day, decreased per diem, decreased overtime, decreased terminal time, minimum switching in all yards, quick and dependable freight service and lessened liability to claims from delays in transit and opportunity for thefts.

Securing Better Results From Fuel

The committee of which H. R. Saunders, division superintendent, Rock Island & Pacific, is chairman, presented a report dealing with the many ways in which operating men can help to save fuel. The report had been written by J. M. Hood, general superintendent, A. C. & Y. An abstract of the report is printed below.

The environment, love of work and long experience of the average railroad employee demand that fuel economy requirements and instructions, as well as all others, be free from absurdities. They are quick to sense any undue stress laid upon one thing and from long experience know that instructions which go too far are the easiest ones to violate.

Our typical railroad employee is staid and does not react very well after a "hurrah" fuel economy campaign has died down. It is better to win him over gradually and avoid the use of a trumpet. The men who compose the backbone of our transportation machine have become sold on the cold, practical bases of good railroading. They are fully aware of the effects of temperatures, wind, gravity and inertia, and although they may not be able to give you a very good explanation of them, they are quick to detect any attempt to gloss over them when considering the consumption of fuel.

While the division superintendent can enter wholeheartedly into the conduct of any tests prescribed for his division to determine the grade of fuel, its preparation, distribution, the quantity to be carried in tipplers, stock piles and cars, and similar matters, ordinarily he will find that most railroad organizations possess men who can give these matters more and better attention than he can

possibly give them, and he should avoid any criticism unless his own study has produced enough facts to make him absolutely sure of his ground. In this connection he cannot ignore the influence of other or adjacent divisions which affect his own. The same admonitions apply with reference to the general design of power, and the mechanical specialties placed thereon. He should know what they are, how they ought to be used, have knowledge of proven devices which are not in use on his division and be able to make intelligent recommendations along these lines. He should never allow himself to sit back and condemn everything that is furnished and be content with the record he has achieved because he is not satisfied with his equipment.

In the location of passing tracks, water stations, telegraph offices and other facilities which may require stopping of trains, the superintendent is in the best position to make intelligent recommendations and he should feel free to conduct a study with a view to securing as advantageous a location of these facilities as possible.

Working through his engineer maintenance of way, the division superintendent has probably one of the least appreciated opportunities for reducing fuel costs. Too often slow orders which are not actually necessary are permitted over bridges or pieces of track at strategic points, such as the foot of grades, or are allowed to continue too long through negligence in planning or completing the necessary repairs. Maintenance of way material receives, undoubtedly, the poorest grade of transportation of any produced by most railroads. It is seldom that any really constructive thought is given to the proper

point to which a car of company material should be billed, to see that complete and detailed unloading instructions are given maintenance of way foremen who will do the actual unloading, and that proper advice is given in advance to the transportation forces so that no unnecessary setting out or back-hauling of the material need take place. No work train ever ought to be permitted on a railroad without the personal sanction of at least a staff officer and usually that of the division superintendent. Careful thought should be given to see that the train is necessary to complete the work economically and quickly, that maintenance of way forces and material are on hand, that the correct day of the week is chosen on which to do the work, that the correct hour for starting is given to the roundhouse, crew dispatcher, train dispatcher and maintenance forces alike, and that the most economical and heaviest class of power is assigned to the work which can properly be spared for that purpose. Do not permit your maintenance engineer to minimize the importance of a constant supply of water rather than to allow any little defect to close a water station, making necessary long runs for water or reduced tonnage. Likewise, do not allow the waste of fuel in pumping stations or leaks in the water supply system, which also account for a wasted fuel.

The quality of work and the time consumed in doing it, by any terminal, are an infallible index of the experience, intelligence and energy of the yardmaster. If trains are properly made up, short cars segregated into separate trains, or at least on the head end, and all trains are ready on time, the goodwill that is reflected up and down the railroad through the dispatcher's office and everywhere will enable the yardmaster to get nearly anything he wants from the dispatcher and the local freight house. Then he seldom has any difficulty in taking all trains offered.

The trainmaster must see that his trains are properly loaded. The so-called peg system or the determination of the best time and the proper interval in starting trains out of any terminal is likewise important. The old bogey of light engines should have the trainmaster's attention, but not to the extent of loading down each alternate train to tonnage and allowing an equal number of lights to run. This makes good looking figures but is not the most economical operation. The trainmaster should feel it his duty to keep the number of locomotives in service on a division at the lowest possible number. He should not be content with leaving this up to the roundhouse foreman or even the master mechanic.

The road foreman of engines and traveling fireman are the two men who probably can do the most directly toward saving fuel. The road foreman should never pass over a steam failure until it has been investigated and the primary cause ascertained. It is useless to record failures unless the real cause is known.

Locomotives popping are not only wasting our money but are an absolute menace to safe operation where hearing or vision are essential, and they are also obnoxious to the public and the employees. The fireman who carries the thinnest fire ordinarily does the least work and furnishes the most steam with the lowest fuel consumption. The traveling fireman has an unending job to see that real firemen are made on his division. Engines should not be allowed to go on the dock where their fire will be dumped in a few minutes when there is a quantity of green coal in the firebox.

Every train delay means coal burned to no purpose. The majority of delays can be lessened, and no one can exercise greater control over these than the train dispatcher. He is usually in a position to keep all concerned, yardmasters, roundhouse foremen, maintenance foremen, operators, bridge tenders, etc., apprised of train movements to be made so that each of these persons can be ready. Likewise, to do the best work, train dispatchers are entitled to prompt information when there is any change in the line-up as to work trains, engines coming off the dock, or otherwise.

The chief dispatcher ought to keep 12 hours ahead in everything, particularly weather conditions. If he will see that every individual possibly concerned is aware of impending storms, high winds or appreciable variations in temperature, he will be rendering his division a great service. The chief train dispatcher should keep fully posted on the movement of engine fuel. There is no excuse for running out of fuel at one point on a division or allowing too much of it to concentrate at one point, even though the division itself does not actually distribute its fuel.

Likewise the chief dispatcher ought to be aware of the strategic points at which to keep a little coal for 16-hour engines, work trains and other emergencies.

Roundhouse forces with their control over the repairs of minor things, proper cleaning of fires, adjustment of draft appliances and supplying of locomotives are a great factor in the consumption of fuel on the road. They likewise consume considerable of it before they turn the engines out of the terminal. The same principles of careful firing and a regard for the rate at which steam is to be consumed ought to be drilled into hostlers and engine watchmen just as carefully as into firemen. The roundhouse foreman is entitled to know at all times what engines are coming and how long he can conveniently have to turn them. He should also be required to apprise the yardmaster, chief dispatcher, or both, just as soon as he possibly can after an engine has reached his dock, when he can put the engine out really ready for service.

The report was adopted without discussion.

Movement of Empty Cars—Preventing Hot Boxes

Two resolutions on the movement of empty cars and the prevention of hot boxes were submitted by the Committee on Interchange Car Inspection of which G. G. Derby, superintendent, Atchison, Topeka & Santa Fe, was chairman. The resolutions follow:

At interchange points, where it is practicable, joint inspection shall be arranged to eliminate duplication of inspection and unnecessary cross-haul of cars. This serious problem calls for preventive rather than remedial measures; the only effective way of lessening the number of hot boxes is to remove the causes of them. Better brasses should be used and an improved method of lubri-

cation employed; also greater mechanical care in the shops is desirable in finishing journals and fitting journal bearings. Journal bearing wedges need special attention. Systematic, periodic inspection is imperative; reports should be promptly and fully given, and there should be some accurate means of checking the person responsible.

The committee recommended the following procedure with regard to hot boxes:

1. When a hot box occurs the conductor shall wire the proper officials, giving number of car, contents, destination, and, if possible, cause of the box running hot.
2. The chief dispatcher shall transmit this information,

either by wire or traingram, to the general car foreman and division car foreman, so that they may handle the matter with the person responsible.

3. The car department shall arrange to show on every car the individual who last inspected it, either by his pool number or some other method of identification.

4. The chief dispatcher shall include hot boxes in the report covering engine and equipment failures which he makes to the superintendent and master mechanic.

5. Trainmen taking hot boxes into a terminal shall be required to notify the mechanical forces, so that the cars may be given attention before being forwarded.

6. The rules of interchange shall be amended, making it mandatory to renew the packing in journal boxes at certain intervals, those intervals being more frequent than at present. Such repacking on foreign equipment should be done on a bona fide repair track at the expense of the car owner.

The sixth clause was incorporated in the resolution because foreign cars give the railroads the most trouble in the matter of hot boxes, the tendency being to neglect such equipment owing to the lack of compensation for the work. The recommendations were approved without discussion.

Increasing the Daily Average Mileage Per Car

J. M. Walsh, superintendent, and J. S. Reedy, inspector of stations and transfers, both of the Illinois Central, presented a paper on methods of increasing the daily average mileage per car. It read in part:

To increase the daily average mileage per car, cars should be assembled in blocks at points of origin to avoid switching at stations and intermediate terminals. Sufficient attention should be given this feature to have its real value made clear to the employees whose duties require such work.

In the operation of divisions or entire railways, local conditions should not be the factor to be considered when the question of increasing the car miles per day is the objective. The division or system must be taken into account as a whole.

Loaded cars ready for movement should be switched out and moved in the first available train. Empty cars should be switched from industries and moved promptly. The matter of waiting for industrial plants to load or unload all cars on a siding so as to reduce switching must be forgotten when equipment is scarce and car miles per day are a factor in supplying any demands required. This applies to empty cars as well as loaded cars. Loaded cars should be moved in the first available train, regard-

less of the demand for equipment, for the reason that service is now the slogan and revenue is not secured until delivery of traffic has been made.

There may be some fear of frequent switching of industries as being too costly, but service demands cannot be met or increased efficiency secured if cars are permitted to stand idle when service could be furnished.

At terminals where yardmasters and their assistants are employed on outlying districts, supervision should be sufficient to see that no cars are left standing that should be moved during the hours of service, and that cars are not permitted to stay until the next day. Yardmasters and yard clerks should be in a position to know that the individual car is being properly handled.

The importance of knowing when cars are in need of repairs, of moving them to the repair track promptly, of cars being repaired promptly after reaching the repair track, of their being moved promptly after being repaired, and forwarded in preference on account of being delayed for repairs, should be considered. Such handling is of sufficient importance to justify reports following the individual car to be handled between the car inspector, yardmaster, car foreman, trainmasters and superintendents, if any unusual delay is met in the handling.

Report on Train Rules

The Committee on Train Rules, of which C. A. Mitchell, superintendent, New York, New Haven & Hartford, is chairman, reported briefly on several pertinent topics. With respect to the abolishing of 31 order and exclusive use of 19 order, it reaffirmed the previous recommendations of the same committee. Reporting on operating rules necessary in automatic train control territory, it held that no change is necessary.

The committee did not recommend any changes in the observance of Rule 99 by the flagman in automatic signal territory but it realized that there might be local conditions where special instructions should be issued to cover specific conditions.

On the question of operating trains against the current of traffic, the committee recommended that where the movements are fully protected by proper signaling devices, full utilization of track systems should be taken advantage of, and that in the absence of such devices such operations should be conducted only by the use of train orders.

In discussing the use of the 19 order in place of the 31 order, it was generally conceded that the 19 order offers advantages which make it valuable. The extent to which it should be used, however, brought forth an

extended discussion. J. W. Knightlinger, Texas & Pacific, argued that the 19 order should not be used in placing a new timetable in effect on account of the lack of the trainmen's signatures. Victor Parvin, Ann Arbor, disagreed with this and told of the success of his company in completely abolishing all use of the 31 order. He was supported by several other members. It was decided that in the future the train rules committee will work with the Signal section, A. R. A.

Other Discussion

Two reports published in the *Railway Age* last week were discussed after our going to press. The question of reducing grade crossing accidents was considered at length and several suggestions were advanced. W. W. Fuller, Seaboard Air Line, stated that the Virginia and North Carolina "stop" laws had reduced such accidents in those states 50 per cent. The association adopted a resolution that whistle signals should be changed so that the last blast will be made as the engine reaches the crossing, and that suitable laws should be passed to force motorists to stop their cars upon reaching railway crossings.

Western Roads Ask Livestock Rate Increases

Brief filed with Interstate Commerce Commission shows present rates too low

THE western railways have filed a brief with the Interstate Commerce Commission in the general western livestock case contending that the Hoch-Smith resolution calling for a general investigation of freight rates, requires an advance of 20 per cent in livestock rates. The brief which was prepared by K. F. Burgess, general solicitor, Chicago, Burlington & Quincy, R. J. Hagman, assistant general solicitor, Great Northern, R. S. Outlaw and J. L. Stewart, primarily answers the complaint of the American National Livestock Association which has before the commission a petition for restoration of pre-war rates on livestock, the brief not merely asking dismissal of the complaint but asking also an advance in the rates, as indicated.

The western railways have presented in this brief a comprehensive picture of the livestock industry. It is their claim that the livestock interests have secured preferences in rate adjustments in the past and that the time has come for the elimination of this discrimination. The favorable economic conditions of the livestock industry, the western roads' need for additional revenue, the expensive features of livestock traffic, the increased value of service to livestock shippers and the present relatively low livestock rates, are advanced by the western roads as factors in support of their claim that livestock rates should be increased 20 per cent rather than decreased. An abstract of their brief follows.

An incident to the preference given to the livestock traffic in the matter of rate advances and reductions, is found in the relationship of the freight rate to the value of the commodity. The increase in the value of livestock was associated with the general rise in commodity prices. With the freight rates on livestock remaining stationary, the percentage relationship of the freight rate to the value of the commodity transported declined materially throughout the period. In February, 1925, the price of cattle at Kansas City had increased 104.5 per cent, while the freight rates on cattle had increased only 41.9 per cent, with the result that in February, 1925, the freight rates from the same points of origin to Kansas City were only 2.7 per cent of the market price at Kansas City. The increase in the market price of sheep and hogs was even greater during this period, with the result that there was an even greater decline in the percentage relationship of the freight rate to the market price of these commodities.

The revenue of the western railroads from their livestock traffic in 1923 was as follows:

Revenue from Livestock Traffic (Western District, 1923)	
Cattle and calves	\$41,719,000
Sheep and goats	8,805,000
Hogs	25,935,000
Total	\$76,459,000

On livestock the car mile earnings were 14.08 cents in 1913 and 21.67 cents in 1923, and on all carload freight, 18.05 cents and 29.34 cents respectively for the two years. The ratios 1923 to 1913 were therefore 153.9 per cent on livestock and 162.8 per cent on all carload freight.

It may be assumed that the reduction sought in livestock rates would take off approximately one-third of the the present revenue. This would reduce the revenue of the western carriers on their livestock traffic by \$25,519,000 in round figures. The loss would be most heavily felt by the principal livestock carrying roads as shown in the supplemental briefs. As to some it would be disastrous in its effect on their ability to meet even their fixed charges.

Favorable Economic Condition of Livestock Industry

The farming industry generally has so improved since the deflation following the war that the purchasing power of the individual farmer has reached the pre-war standard and that in the livestock industry in particular, prices are still on a marked upward trend.

In no part of the agricultural industry has this restoration to profitable operation been so marked as in some phases of the livestock industry. For example, the producer of sheep suffered from the shortest period of deflation in any branch of the whole agricultural industry, and for the past two and one-half years his operations have been conducted on an extremely profitable basis. The increase in the farm prices of hogs indicates in an even more striking manner the nature of the recovery from the period of deflation and the much higher price level at the present time than existed prior to the war. In the case of cattle the recovery from the period of deflation has been slow because of the fact that it takes a longer time for the cattle industry to adjust itself to new conditions than is the case with the other major livestock products. It simply remains one of the problems of the cattle producer with which reduced freight rates cannot help him to cope.

The advance in the price of livestock has already been sufficient to relieve the industry. Particularly is this true in respect to sheep and hogs, and the prices for cattle, while not reflecting the same degree of advance, offer marked encouragement to the industry.

Western Roads Need Additional Revenue

Railroads in the western district have not been permitted to charge rates for the transportation of commodities, sufficient in amount to pay the increased costs of operation and leave an adequate net return either to the capital invested in their properties, or to the value of their property devoted to the transportation service. During the past 14 years, while labor and material prices have been rapidly advancing, the western railroads have not enjoyed the same measure of increase in their rates as has been permitted in other sections of the United States. The smaller advances which have been authorized in respect to the western railroads, and the greater reductions in rates which they had to extend on account of the post-war agricultural distress, have borne so heavily upon them that they are now before the Interstate Commerce Commission on a petition for a general increase in their freight rates.

Unfortunately, the record does not disclose the relative

prices of labor and materials which the railroads are compelled to pay now as compared with what they paid in 1896-1897 and the years immediately subsequent thereto, to which period the complainants seek a restoration of the rate level on livestock. But the record does show in considerable detail what the unit costs of railroad operation are today as compared with the test period under the federal control act, that is, the years of 1915, 1916 and 1917. It is estimated that the present labor cost reflects an advance of approximately 100 per cent over the test period and that materials and supplies purchased by the railroads represent an average advance of 75 per cent.

Inasmuch as the rate advance cases of 1903, 1910 and 1915 show that there had been a material increase in both labor and material costs prior to the test period, and subsequent to the time when the level of livestock rates to which the complainants seek to revert was established, it must be apparent that the livestock interests can advance no substantial reason for having their traffic escape entirely from its contribution to any of these increases in the cost of railroad operation.

Thus far we have been dealing wholly with the question of the out-of-pocket cost of transportation. Of perhaps even greater significance to the maintenance of an adequate system of transportation is the necessity for revenues sufficiently large not merely to pay the out-of-pocket cost, but to contribute sufficiently to a return on capital and property value so as to rehabilitate railroad credit, make investment in railroad securities attractive, and thus insure a system of transportation which will be adequate to meet the demands of shippers and patrons and of the public at large which is dependent in the United States for its economic life upon the fostering of railroad transportation.

The results of operation of carriers in the western district for the last four years show the following rate of return actually earned by the carriers in these groups in relation to investment in road and equipment, including materials, supplies and cash.

Rate of Return upon Investment Earned by Class I Carriers in the Western District.

Calendar Year	United States	Western District
1921	2.91 per cent	3.12 per cent
1922	3.60 per cent	3.45 per cent
1923	4.48 per cent	3.96 per cent
1924	4.33 per cent	3.87 per cent

Livestock Traffic Expensive

The burdens upon the railroads incident to the transportation of livestock have been frequently generalized by the commission. Special investigation was made by nine railroads in the western district, comprising 59,262 miles of line, of the loaded and empty car miles of the different classes of equipment for the month of October, 1923. The result shows a greater empty haul of livestock cars than of box cars, refrigerator cars, coal cars, flat cars, or of the average of all cars. The nature of the equipment required for the transportation of livestock makes this result inevitable. The large empty haulage of livestock cars shows a heavy burden placed upon the railroad in transporting livestock, much heavier than in respect to the average of all freight.

The inherent nature of the livestock traffic is such as to greatly increase its susceptibility to loss and damage, for which the railroads must pay, over other forms of traffic. The percentage of loss and damage payments on livestock to the total loss and damage is increasing. This in part reflects the increase in price and value of livestock to which attention has previously been directed.

No commodity moving in substantial volume loads so

lightly per car as livestock. While the average loading of livestock is less than 11 tons per car, the average tons per car of all carload freight is 29.31 tons, as to these carriers. This is a burden to the carriers inherent to the nature of the livestock traffic. Not only is its loading less than 35 per cent of the average of all carload freight, but it has not yielded to the efforts of the carriers to effect economies through heavier loading. Livestock loading has remained stationary for many years, while carload freight has increased from 25.75 tons per car in 1914 to 29.31 tons in 1923.

Not only does livestock load much lighter per car than the average of all carload freight, or in fact than any other freight moving in substantial volume, but a train load of livestock is much lighter in revenue loading than the average freight train operated by the carriers. This results in greatly increased costs of transportation in respect to livestock contrasted with other traffic.

No compensating advantage accrues to the railroads by reason of the light loading of livestock per car or per train. Instead the increased speed required to transport this perishable commodity results in shorter trains and greater fuel consumption.

By reason of the amendment to the Interstate Commerce Act approved February 29, 1920, the carriers are required to pay for the loading and unloading service on livestock in carloads at public stock yards, and also at intermediate points. This service of the carriers in respect to the unloading of livestock differs from the service which they render to other carload freight and represents a burden upon them for which they have no compensation other than the freight rates for the transportation of the livestock.

Other expenses met are for showering hogs, for cleaning and disinfecting stock cars, the gathering service on branch lines, the interference with other freight movement by reason of the necessities for expedited movement on livestock, terminal costs and the maintenance of loading and unloading chutes at country stations.

Livestock Rates Relatively Too Low

With an empty haul of equipment approximately twice that of the average for all other carload freight, with approximately 35 per cent of the average loading per car of all carload freight, and with loss and damage claims more than twice as heavy as on the average of all freight, the livestock rates fail to provide earnings commensurate with the service rendered by the carriers. No compensation whatever appears to be included in the rates for many of the facilities demanded and received as incident

Average Revenue per Car Mile of Carload Traffic.
(Calendar Year 1923—figures represent cents per car mile.)

Commodity	Car Mile Revenue 6 Systems 27,672 Miles	Car Mile Revenue 27 Systems 70,763 Miles	13 South- Western Systems 30,963 Miles
Livestock	21.67	21.57	21.40
All other animals and products ..	28.82	27.01	30.07
Total animals and products	23.94	23.70	24.36
Products of agriculture	25.48	26.46	25.87
Products of mines	39.88	37.93	37.38
Products of forests	25.09	24.18	26.41
Manufactures and miscellaneous ..	31.72	31.82	33.52
Total (excluding animals and products)	30.24	29.72	30.53

to livestock transportation, or for any of the burdens placed upon the carriers by the inherent nature of the traffic.

Not only have the livestock rates been the subject of preferential treatment in the recent general rate advances and reductions, but they still reflect the "missionary" rates put into effect at an early date in an effort to help

develop the western country. The aggressive efforts of the livestock associations from 1896-1897 down to the present time have kept these rates on this low level.

The failure of the livestock rates today to yield revenue properly proportioned to the revenue on other traffic is shown by the preceding table.

In the accompanying table the contrast between livestock and all carload traffic, excluding animals and products, is of particular significance for the average haul of the two classes is substantially the same.

These figures show the utter futility of a demand that the rates of livestock be put back to a pre-war level. Instead the evidence shows that the present rates must be raised to take care of the increased cost of railroad operation.

Rate Reductions Impossible

Under the Interstate Commerce Act the livestock rates are unlawful if they are either unreasonably low or so low that they constitute a preference or advantage over other traffic. Even in respect to the "products of agriculture, including livestock," the Joint Resolution of Congress approved January 30, 1925 (the Hoch-Smith Resolution) merely provides that the commission shall so act that these products shall move "at the lowest possible lawful rates." But even if this were not a part of the statutory law, it is a part of our fundamental or constitutional law as it has been interpreted by the Supreme Court of the United States. Due process of law is denied and property is taken without just compensation when the state requires the transportation of persons or particular property at non-compensatory rates, regardless of whether the burden be made up on other forms of traffic.

Inasmuch as even the complainants were ready to stipulate that it costs 20 per cent more in respect to livestock than with respect to the average of all carload freight, it is apparent that under the present level of livestock rates the burden of expense has to be met by rates on other forms of traffic.

With the exception of isolated territory where the livestock producer has failed to adjust his methods of production to the economic needs of the day, the industry has been rehabilitated by the economic law of supply and demand coupled with such assistance in respect to credit as has been extended by the federal government. On the other hand, the railroad industry in the west has not been restored to anywhere near its condition of pre-war earning power. No one can reasonably assert after reviewing the evidence of record in this proceeding, that the railroad companies in the west can long continue to furnish adequate transportation service unless the rates for transportation are increased. They are operating under increased costs; they have exerted a maximum effort towards efficiency of operation and economy of management. The state and federal governments are calling upon them yearly to pay an increased tax burden; the rate of interest which they have to pay on refunding operations or for new money has advanced; the percentage of their capitalization represented by bonded indebtedness has gradually increased, and the return to the investor in railroad stock has declined.

The record substantiates in every particular the proposition that the livestock rates should now be increased by at least 20 per cent. The economic condition of the livestock industry warrants this; the necessities of the railroads for increased earning power requires it; the duty which the Transportation Act, 1920, and the Hoch-Smith Resolution lays upon the commission enforces this conclusion. The facts are clear; the law is definite, and the conclusion seems irresistible.

Increased Value of Service

Justifies Advance in Rates

Value of service to the shipper is an illusory phrase not susceptible of mathematical demonstration. It has been defined as "the difference in the price of a commodity between point of origin and destination."

But as now used by the shippers, it seems to mean an intangible yard stick by which railroad rates on their particular product may be kept down or further reduced. It seems to be exactly what Commissioner Lane was describing when he said "this theory entitles the railroad to enter the books of every enterprise which it serves and raise or lower rates without respect to its own earnings, but solely with respect to the earnings of those whose traffic it carries."

Measured by this standard, the value of the service of transportation to the agriculturist in general and the livestock producer in particular, is today such that rates should not be reduced to the 1896-1897 level; instead, they should be substantially increased.

We have previously shown that the value of the commodity in the markets has greatly increased since 1896-1897. Since 1900 farm land in the Mountain-Pacific group has increased in value 321.46 per cent and in the other western states 262.16 per cent. The value of livestock in the western district increased from \$2,130,177,000 in 1900 to \$3,669,035,000 in 1922, and in the United States from \$3,306,473,000 to \$5,807,104,000. This increase in value was likewise accomplished with no substantial increase in the production.

All of this increase tells a graphic story of what the value of the service of transportation rendered to the shipper has been, how it has increased his productivity, his wealth and his income. Industry in the United States, on account of the wide area of distribution of its products, is dependent upon railroad transportation. With his great increase in wealth and income, the farmer is able today to pay much higher freight rates for his transportation service than in 1896 or 1900. His productivity is greater, the values of his products are higher, and more of his wealth is subject to depletion in the event of an impairment or break down in transportation service. Consequently the value of adequate transportation to him is much greater than formerly.

The livestock producer cannot reasonably expect to buy transportation for what he paid for it in 1896-1897. He, like all other shippers, must pay his fair share of the cost of maintaining a system of adequate transportation upon an increased cost level, otherwise all free interchange of commodities in the United States must cease.

It is a particularly significant fact in the present case that the freight rates on livestock bear a very low ratio to the value of the commodity in the markets. A report of the National Livestock Producers' Association shows that of the gross proceeds of all the livestock sold by that association in 1923, the freight charges constituted only 3.48 per cent of the total. The shippers have insisted upon the necessity of expeditious and adequate transportation service. A witness of the complainant's emphasizes the point that the livestock men in the short space of four or five years could better have afforded to pay for the building of stock cars sufficient to move their livestock than to have suffered the financial loss incident to car shortage.

Inasmuch as the record shows that nine western railroads in the years 1922, 1923 and 1924, expended \$15,515,000 to purchase 8,377 additional stock cars, some idea may be gathered of the value which this witness placed upon adequate and expeditious transportation service.



The Chateau Lake Louise, Showing the New Addition at the Right

Building a Twelve-Story Concrete Structure in Zero Weather

THE construction of a 12-story building of reinforced concrete during the winter in the temperatures encountered in the Canadian Rockies was the unusual project which confronted the Canadian Pacific last fall following the burning of the wooden portion of the Chateau Lake Louise in July, 1924. To replace the structure which was completely destroyed, it was necessary to erect a new fire-proof building ready for operation by the opening of the new season on June 1 of this year. This was a problem of no mean magnitude as Lake Louise, the site of the hotel, is 640 ft. above the main line track and is accessible only by a narrow gage tramway $3\frac{1}{2}$ miles long on which passenger trams run during the season. On the close of this traffic these cars were converted into freight trucks to carry the building materials and they, with the help of a small oil-burning dinkey, had to carry the whole of it, 28,000 tons. The track, with sharp curves and steep grades, is practically all on side hill, and there are deep cuts subject to snow slides.

Power was taken from Lake Louise through 3,300 ft. of 33 in. flume laid on the bed of the creek and feeding two generators of 187 and 75 kw. capacity. These units supplied all of the power required for hoists and mixers, compressors, etc., and the lighting.

The lake is supplied by water from the glaciers on Mount Victoria and Mount Lafroy. It is 220 ft. deep and little water goes into it during the winter. It was, therefore, necessary to conserve the water as much as possible, owing to the shallow depth of the intake.

The main portion of the new building is 55 ft. wide by 285 ft. long and about 115 ft. high and consists of a basement and nine floors. In addition to public rooms and

other facilities, it contains 300 bedrooms, each with bath. The extension is a modern fireproof hotel building, consisting of steel frame; reinforced concrete and tile floors; concrete, brick and stucco walls; tile partitions; sloping roofs of copper and flat roofs of tar and gravel; finished floors of stone and quarry tile for the principal rooms.

In designing the new addition it was necessary to take into consideration the existing wing, and the new addition was designed in such a manner that with certain modifications in the design of the existing wing the entire hotel building would be a unit.

Entire Structure Was Enclosed

To permit concreting to proceed without interruption during the winter an outside hoarding was erected around the entire building, approximately five feet away from the building line; this consisted of 2-in. by 8-in. studs spaced at 33 in. centers in the lower stories, and 2-in. by 6-in. studs in the upper stories. These were capped, strutted and tied to the steel spandrel beam at each floor level and were sheathed on the outside with common boards and lined inside with sheeting with heavy tar paper cleated to the sheeting and studs. Cheese cloth windows were left at frequent intervals to give some natural light, although artificial light was used both day and night for construction work.

This hoarding was erected as fast as the erection of the structural steel would permit, and suspended forms for the concrete floors were also erected right behind the steel gang at the same time. On the outer walls of this hoarding in the lower two stories about 10,000 lin. ft. of $1\frac{1}{4}$ in. pipe with the necessary headers was installed and con-

nected up originally to the present boiler house, but when the weather became more severe three temporary boilers were added.

After about six floors of framing were in place the fifth floor forms were flashed across to the hoarding and concrete pouring started, the hoarding and form work in the meantime proceeding right behind the steel gang. At the time the fifth floor was ready to pour flashing was placed across from the seventh floor forms for a temporary roof, and by the time the seventh floor was ready to pour the gypsum roof was in place and flashed across to the hoarding in its final position.

The ground floor slab was poured before freezing weather arrived and the concrete poured in the hoarding started with the second floor, the eight floors, from the second to the ninth being poured complete in 17 days. The cement finish was placed integral with the slab. The top floor was poured the week before Christmas.

Practically all of the work inside the building and outside was finished before the removal of the enclosure and the building was completed in every detail, the furniture installed and the hotel ready for guests by June 1. This work was carried on by Barott & Blackader, architects, of Montreal, under the supervision of J. W. Orrock, engineer of buildings, reporting to J. M. R. Fairbairn, chief engineer of the Canadian Pacific. Basil Gardom, superintendent of construction and repairs of western hotels for the railway, was in charge of the work on the ground, including the delivery of materials from the railway to the hotel. T. T. Rutherford was the representative of the architect and H. S. Bare, building inspector, was the representative of the railway. The contractors were Carter-Halls-Aldinger Co., Ltd., of Winnipeg, Man.

Checking the Efficiency of Stores Operations

THE arrival of a period in transportation when the margin between profit and loss depends upon economies within the machinery of transportation to a greater degree even than is sometimes comfortable has had the effect of causing all departments to take inventory of their practices. That the highest improvement in efficiency and operations has not yet been reached is suggested by specific weaknesses found by one road in its stores organization. Since these weaknesses are typical of what might be revealed on many other roads and of a type, the toleration of which can materially hamper forward-looking programs, they are presented as a list against which the stores departments of other lines may check themselves. The following is an abstract of the report in which these weaknesses are enumerated.

Requisitions Delayed: It is the aim to clear all requisitions for a given period before the receipt of requisitions for the following period but efforts in this direction are constantly defeated through failure to get the inventory record from each store in accordance with prescribed schedules. The delay in forwarding the inventory records from one point entails a corresponding delay for all requisitions for the period represented. An analysis indicates an average maximum delay of 6½ days for each period investigated, the effect of which is to delay the issuance of material, etc., approximately one full period.

Faulty Reports of Surplus: There is every indication that, regardless of repeated instructions, stores officers are not reporting surpluses as liberally as conditions warrant.

Faulty Descriptions: Frequent changes in requisitions are necessitated because of the failure of stores officers to

order material exactly as it appears in the description columns of the stockbook.

Reason for Purchase Lacking: The stores officers are often delinquent in reporting the necessity for ordering supplies of any items ordered on requisitions which are not normally carried in stock.

Emergency Orders

Emergency Orders: Experience with the efforts made by storekeepers to expedite the receipt of material required in emergencies discloses the failure to be sufficiently specific in reporting the quantities actually required to relieve the emergency without requiring a complete shipment of all the material called for on the original requisition. For example: if a requisition covers 20 castings of a certain pattern and only two are required to afford immediate relief, information to this effect will greatly increase the possibilities of an immediate shipment in cases where it is difficult to fill the requisition completely at once.

Correspondence: There is much delay in furnishing replies to inquiries, for additional information or description of items ordered on requisitions with the result that the placing and filling of the orders for the material is correspondingly delayed.

Stock Book Revisions: Stores officers are found slow to acknowledge the receipt of stock books, circulars, publishing changes in classifications and, as it appears, correspondingly slow to make the necessary corrections of records.

Invoices Delayed: Standard practice requires that invoices covering material purchased to conform to specification should indicate that the reports of tests are in the store officer's possession. These instructions are not always observed, with the result that invoices are delayed correspondingly in handling.

Express Receipts: It is the exception rather than the rule for stores officers to indicate on the express receipts which accompany invoices that the express shipment was or was not authorized; thus affording the necessary information with which to determine whether the shipper is to be charged additional expense for the shipment.

Freight Charges Missing: A space is provided on all invoices for the insertion of the amount of freight or express charges due on shipments, but some stores officers are failing to provide this information.

Payments Delayed: Investigation reveals the failure to attach invoices covering local purchases to the requisitions when forwarding, the effect of which is considerable lapse of time before the two are connected, with attendant delays in the payment.

Culled Lumber: On recommendations covering culled lumber, the specific purpose for which the culled lumber is to be used is not being shown, although important.

Office Work

Delay in Office Work: It develops that forms provided for the purpose of reporting all materials delivered for which invoices are not received within 30 days are not mailed promptly with the result that a deluge of these forms occurs immediately prior to and during annual inventory with attendant confusion and increased difficulty in completing the information required before payment.

Drums and Crates: Noticeable trouble has resulted from failure of parties making shipments of drums, superheater crates, carboys, empty cement sacks, etc., to furnish promptly copies of every bill-of-lading issued, the effect of which is to cause confusion in office organization and loss to the railroad in obtaining credit.

How Large Systems Are Formed

The Burlington is composed of 204 companies consolidated during seventy years

ONE of the most discussed subjects concerning the railroads is that of consolidations. The paramount necessity of consolidating all of the railroads into a few systems has been constantly urged and elaborate plans for enforced consolidations have emanated from various sources. To pass upon the desirability or necessity of enforced consolidations, it is important to study the methods by which consolidations have taken place in the past and the importance they have had in developing the railroads in this country today.

The fact is that most of our railroad systems owe their present size to the consolidation and absorption of many small disjointed lines, but these have all been voluntary consolidations. History shows this to have been the general method of expansion, although a few railways like the Union Pacific and the Northern Pacific reached their present size primarily through pushing out into territory remote from other transportation, the Union Pacific as a union saver, and the Northern Pacific through the energy of Mr. Villard.

There is no better example of a railroad which has thus expanded through voluntary absorption of lines than the Chicago, Burlington & Quincy. The present system comprises nearly 10,000 miles of road constructed originally by 204 separate companies. Its tracks now extend into 12 states, as a result of new construction to some extent, but principally through consolidation with and absorption of small roads. The history of the Burlington and the history of each of the 204 companies composing the present corporation is presented in detail in a book of 500 pages, the author of which is W. W. Baldwin, vice-president of the Burlington. The following information is abstracted from that book.

The Original Line

The present Chicago, Burlington & Quincy Railroad Company came into existence through the consolidation of three railroads. These were the Chicago & Aurora, the Central Military Tract, and the Peoria & Burlington. The "Aurora Branch" was organized under a special act of the legislature of Illinois on February 12, 1849, and its construction marked the beginning of the present Burlington system, its name being changed in 1852 to "Chicago & Aurora." The original line, 12 miles long, extended from Aurora north to Turner Junction (now West Chicago) where it connected with the Chicago & North Western. For 30 years, the line of the North Western was used by the Burlington in entering Chicago. In the construction of the original 12 miles of road second hand strap rails were purchased and used, the directors becoming personally responsible for their payment. The equipment consisted of a second hand engine and a passenger car and some freight cars rented from the Galena road.

The early days of railroading in the Middle West are revealed interestingly by the history of the roads composing the Burlington. At that time there was intense rivalry between many towns in Illinois to see which could be the first to finish its railroad. Each little line was constructed separately and in cases where one town's line entered a village served by the line of another town, the stations were located as far as possible from each other in order to discourage patrons from transferring from one

line to the other. Although Aurora was the first to complete its line, called the "Aurora Branch," the people of Peoria succeeded in raising enough money to build 14 miles of railroad called the "Peoria & Oquawka," from Peoria west to Edwards Siding, which was completed in 1851. This aroused the people of Galesburg to a desire for a railroad of their own. Accordingly in 1851 they secured a charter for a road called the "Central Military Tract," which authorized the construction of a line from Galesburg northeasterly to connect with any railroad leading toward Chicago. These three roads were hard pressed by financial difficulties until the spring of 1852 when their promoters succeeded in interesting John M. Forbes, a Boston banker, in their development.

In June, 1852, the charter of the Aurora Branch was amended to provide for a line southwest to Mendota, Ill., and the name of the company was changed to the Chicago & Aurora. Before the close of 1853 this line had been completed. The Central Military Tract, financed by Mr. Forbes, began work in 1852 and completed the link between Galesburg and Mendota in 1854. At the same time the Peoria & Oquawka, with the same financial assistance, began the construction of its line from Galesburg west and completed it to the Mississippi river opposite Burlington in March, 1855. The name of the Chicago & Aurora was then changed to Chicago, Burlington & Quincy and the Central Military Tract consolidated with that company in 1856, the two companies thus becoming one under the present name which has not since been changed. The line from Peoria to Burlington was put through under the name "Peoria & Oquawka," but the company fell into financial difficulties and was re-organized under the name "Peoria & Burlington" with which the original Burlington Company was consolidated in 1864 under the present name and without change in the organization.

Growth Was Rapid Following Civil War

During the Civil War practically no new railroad construction was carried on in Illinois except that in 1884 the Burlington was built direct into Chicago from Aurora via Naperville and the North Western connection was dropped. From 1864 until 1870, however, the spread of the Burlington through central Illinois was rapid.

The "Northern Cross," the last of the roads making up the original Burlington consolidations in Illinois, was completed from Quincy to Galesburg in 1856 largely with the aid of funds secured by Mr. Forbes in New England. It was purchased by the Burlington in June, 1864. At the end of 1864 the Burlington system had 460 miles of line, all in Illinois.

It took over the American Central, a line from Galva to New Boston, which it had promoted in 1868 and in the following year bought the lines of two more companies of its promotion, the Dixon & Quincy from Arpee to Keithsburg, and the Dixon, Peoria & Hannibal, from Buda to Elmwood, a total distance of 44 miles. The Carthage & Burlington, extending from East Burlington to Carthage, 30 miles, was completed and purchased in the same way, also in 1869. The Keokuk & St. Paul, from Burlington, Iowa, to Keokuk, was also taken over

in 1869. The Ottawa, Oswego & Fox River Valley, another company, which had built lines from Montgomery, Ill., to Streator and from Aurora to Geneva, was completed and acquired in August, 1870. The lines of two other companies, the Illinois Grand Trunk and the Quincy & Warsaw, were also taken over in 1870. The Illinois Grand Trunk owned a line from Mendota to Prophetstown, while the Quincy & Warsaw had built a line from

1877. In this purchase the Burlington secured a line 275 miles long extending from Sterling, Ill., to Rock Island and from Barstow south to East Alton, together with two small branch lines. The purchase of the Quincy, Alton & St. Louis, a line from Quincy to Pike, a distance of 43 miles, which was completed in 1876, was another instance of growth in Illinois in this period.

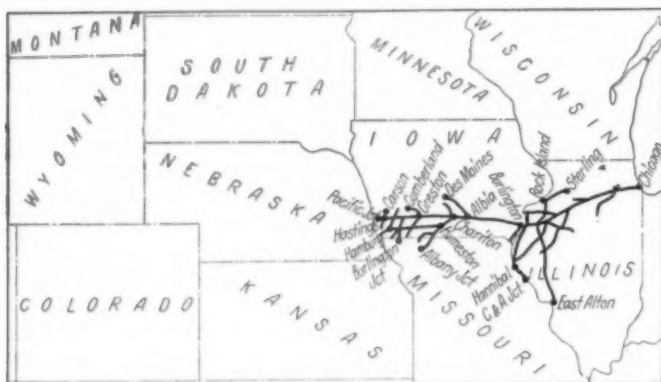
The Burlington's extension into Iowa began on Decem-



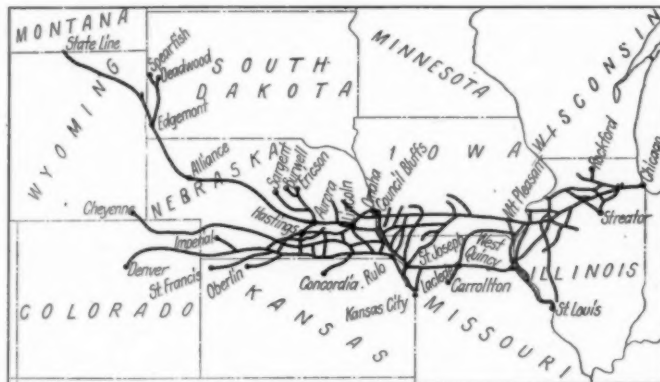
The Burlington in 1864



The Burlington in 1870



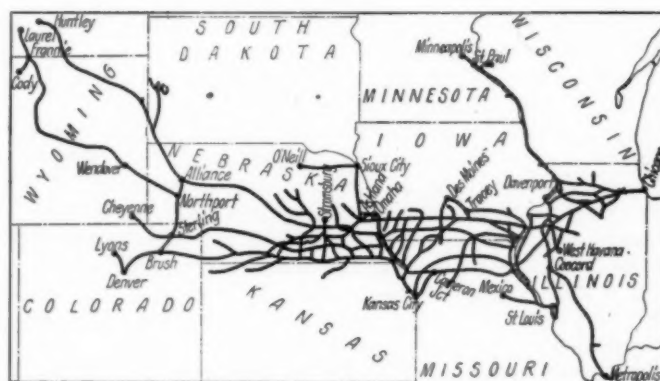
The Burlington in 1880



The Burlington in 1890



The Burlington in 1900



The Burlington Today

Quincy to Carthage, a distance of 40 miles. At the end of the decade, the Burlington had become a system of 810 miles of line.

Growth from 1870 to 1880 Largely in Iowa

Most of the growth of the Burlington in the decade from 1870 to 1880 was made in the state of Iowa although some mileage was added in Illinois. The outstanding acquisition in Illinois in this period was the lines of the St. Louis, Rock Island & Chicago on February 1,

ber 31, 1872, when it secured the "Burlington & Missouri River," which extended from Burlington, Iowa, westward to the Missouri river with a branch from Red Oak, Iowa, to Hamburg. This year also saw the acquisition of the Creston branch of the Burlington & Missouri River from Creston, Iowa, to Hopkins, Mo., 42 miles; the Chariton branch of the Burlington & Missouri River from Chariton to Leon, 36 miles; and the Brownsville & Nodaway Valley from Clarinda Junction, Iowa, to Burlington Junction, Mo., 35 miles. Other roads which found their

way into the Burlington system in the 1870 decade were the Albia, Knoxville & Des Moines, from Albia to Knoxville, 32 miles; the Des Moines & Knoxville, from Knoxville to Des Moines, 35 miles; the Chariton, Des Moines & Southern, from Chariton to Indianola, 33 miles; the Clarinda, College Springs & Southwestern, from Clarinda to Northboro, 16 miles; the Nebraska City, Sidney & Northeastern from Hastings to Sydney, 21 miles; the Leon, Mount Ayr & Southwestern from Leon, Iowa, to Grant City, Mo., and from Bethany Junction to Albany, a total of 103 miles; the Creston & Northern, from Creston to Fontanelle, 27 miles; the Hastings & Avoca, from Hastings to Carson, 16 miles; the Red Oak and Atlantic, from Red Oak, Iowa, to Griswold, 18 miles; the Humeston & Shenandoah, from Van Wert to Shenandoah, 95 miles; and the Western Iowa, from Fontanelle to Cumberland, 20 miles. At the conclusion of this period the Burlington was operating 2,100 miles of line in Illinois, Iowa and Missouri.

Growth Was Widespread from 1880 to 1890

From 1880 to 1890 the growth of the Burlington was not confined to any particular district but was made in virtually all parts of the Middle West. New lines in northern Illinois, lines in Missouri and further extensions of the western lines in Iowa and Nebraska were completed. The Burlington's spread through northern Illinois at about this time was extensive. Among the roads acquired were the Chicago & Iowa, 101 miles long, from Aurora west to Forreston and Rockford; the Chicago & Rock River, with a line from Shabbona to Rock Falls, a distance of 47 miles; the Illinois Valley & Northern, from Walnut to Streator, a distance of 60 miles; the Joliet, Rockford & Northern, with a line from Sheridan Junction to Paw Paw, 20 miles; and the Galesburg & Rio, with a line from Galesburg to Rio Station, a distance of 12 miles.

This decade also saw the entrance of the Burlington into the state of Missouri on an extensive scale. Having lines in Nebraska and west of the Missouri river connecting across Iowa and Illinois with Chicago and the east, it became very important to secure direct lines to Kansas City, St. Joseph, and St. Louis, not only to reach those markets, but also as outlets for its business to the southern and southeastern states. This it accomplished through the acquisition of the Hannibal & St. Joseph, with main lines from Hannibal to St. Joseph and Kansas City and from Quincy to Palmyra Junction, with a branch to Atchison, 272 miles in all; the Kansas City, St. Joseph & Council Bluffs, with a line from Kansas City north to Council Bluffs and Omaha and branches to Hopkins, Burlington Junction and Northboro, 314 miles; and the St. Louis, Keokuk & North Western, from Mt. Pleasant, Iowa, through Keokuk to St. Louis. About this time it also bought the lines of the Chicago, Burlington & Kansas City extending from Vielle, Iowa, to Carrollton, Mo., a distance of 221 miles. These made in all about 1100 miles of road in Missouri with valuable terminals in St. Louis, Kansas City and St. Joseph. In this period, it also secured the St. Joseph & Des Moines from St. Joseph, Mo., to Albany, and the St. Joseph and Nebraska, from Napier, Mo., to a point on the east bank of the Missouri river opposite Rulo, Nebr.

The Burlington's most important expansion in this period, however, was in its lines west of the Missouri river. This growth began in January, 1880, when it was consolidated with the "Burlington & Missouri River Railroad in Nebraska." This company owned a line from Plattsmouth to Kearney, a distance of 191 miles. Other Nebraska lines taken over in this year were the Nebraska Railway, from Nemaha via Nebraska City to York; the

Atchison & Nebraska, from Atchison, Kans., via Rulo to Lincoln, Nebr.; the Lincoln & North Western, from Lincoln to Columbus; and the Omaha & Southwestern, from South Omaha to Oreapolis and from Crete to Beatrice. In 1881 the Burlington & Colorado, a line extending from a connection with the Republican Valley at the Colorado state line to Denver, was acquired. In the following year the Republican Valley, which had a line in southern Nebraska extending from Salem west to the Nebraska-Colorado state line and another line from Lester north to Central City, was purchased by the Burlington.

Another line crossing Nebraska from east to west, the Nebraska & Colorado, with several north and south branches, was secured by the Burlington on October 1, 1883. The main line of this road extended from DeWitt in the east to the Colorado state line at Venango. The present line of the Burlington from Kansas City to Billings began to take shape in 1886 when the Grand Island & Wyoming Central was purchased. This road owned a line from Grand Island, Nebr., via Alliance to the Wyoming-South Dakota state line near Dewey, S. Dak., with branches from Edgemont to Deadwood and Spearfish. The Omaha & North Platte, a short line from South Omaha to Ashland, in eastern Nebraska, was also taken over in that period. In the following year further extensions in western Nebraska were completed through the purchase of the Colorado & Wyoming, from the Nebraska state line to Sterling, and of the Cheyenne & Burlington, from a connection with the Colorado & Wyoming to Cheyenne.

Other sections of the present line were acquired at about this time through the purchase of the Lincoln & Black Hills, with a line from Central City, Nebr., to Ericson; the Oxford & Kansas, from Orleans, Nebr., to Marion; the Beaver Valley, with a line from a connection with the Oxford & Kansas westerly to St. Francis; the Republican Valley, Kansas & Southwestern, with a line extending from Republican, Nebr., southwest through the states of Nebraska and Kansas to Oberlin, Kans.; and the Chicago, Nebraska & Kansas, with a line from a connection with the Republican Valley west of Odell, Nebr., to a connection on the Nebraska-Kansas state line with the Chicago, Iowa & Kansas. The last extension of the Burlington in this decade was the acquisition of the Grand Island & Northern Wyoming in 1889. This line extended from a connection with the Grand Island & Wyoming Central at the Wyoming-South Dakota state line northwest to the Wyoming-Montana state line. By this time the Burlington system had grown until it owned over 5,600 miles of line.

Development Was Slow from 1890 to 1900

The expansion of the Burlington in the decade of 1890 was comparatively small. A few lines were taken over at this time, however. The western extension was supplemented at this time by the purchase of the Big Horn Southern in 1894. This line extended from the northern terminus of the Grand Island & Northern Wyoming to Huntley, Mont., near Billings, where a connection was made with the Northern Pacific. One small line in Missouri, the Grant City & Southern, extending from Grant City, Mo., to Albany Junction, was also bought in this decade.

The Chicago, Burlington & Northern was built in 1885-1886 with the co-operation of the Burlington and in the nature of an extension of its road to St. Paul. The line was built from Oregon, Ill., via Savanna and East Dubuque, to the Wisconsin-Illinois state line, a total distance of 85 miles. This company also had a branch from Savanna to Fulton. The Wisconsin and Minnesota consolidated divisions of the Chicago, Burlington & North-

ern had constructed a line from the Wisconsin-Illinois state line north of East Dubuque to a connection with the Great Northern and Northern Pacific at St. Paul, Minn., a distance of 245 miles. The acquisition of these lines by the parent company in 1899 completed the northern extension of the Burlington as it now exists. The addition of these lines, with a total length of 672 miles, gave the Burlington a system of nearly 6,300 miles of line.

Expansion After 1900

In the far west the company added to its property through the lease of the Nebraska, Wyoming & Western from Alliance, Nebr., to Guernsey, Wyo., and of the Denver & Montana, from a connection with the Nebraska, Wyoming & Western on the northern boundary of the state of Colorado to Sterling. These, with the Denver, Utah & Pacific, from Denver to Lyons, and the Big Horn Railroad from Warren, Mont., to Fromberg and from Frannie, Wyo., to Orin Junction, a total of 350 miles, virtually completed the present extreme western lines of the Burlington.

Other lines acquired about this time were the Chicago, Ft. Madison & Des Moines, with a line from Ft. Madison, Iowa, to Ottumwa; the Murray & Creston from Murray, Iowa, to Creston; the Chillicothe & Chariton, from Frederic, Iowa, to Albia; the Fairfield & Ottumwa, from Fairfield, Iowa, to Batavia; and the Burlington & Western, from Winfield, Iowa, to Tracy.

In 1902 the Kansas City & Omaha, with lines from Stromsburg to Fairbury and from McCool Junction via Fairfield to Alma, a total distance of 192 miles, was purchased. The Jacksonville & St. Louis, a line 121 miles

long, extending from Concord, Ill., via Jacksonville to Centralia, was purchased in 1904. Two years later the present line south of Centralia was acquired by the lease of a construction subsidiary, the Northern & Southern Illinois, from Centralia to Herrin.

The present system was completed through the acquisition of the Adair County Railroad, from Youngstown, Mo., to a point five miles west, in 1911; the Sioux City & Western, from Covington, Nebr., to O'Neill, a distance of 127 miles, in 1907; and the construction of the ten-mile Chalco-Yutan cutoff in Nebraska in 1914. The Herrin & Southern, extending from Herrin Junction, Ill., to Neilson and from West Vienna to Metropolis, was also secured in 1914, this being the last acquisition of importance by the Burlington. In the west, the Burlington added to its line by constructing a line from Toluca, Mont., to Cody, Wyo., 130 miles, and another line from Guernsey, Wyo., to Wendover, 9 miles. Thus the present system of 9,400 miles was virtually completed.

In all, the present Burlington system is composed of 47 different companies in Illinois and Wisconsin, 97 different companies in Iowa and Missouri and 61 different companies west of the Missouri river. While many of these were companies formed by the Burlington for the purpose of constructing new lines and taken over by the parent company, considerably more than half of the 204 companies now included in the present Burlington corporation were local organizations built and operated as independent properties prior to their consolidation with the larger company. It is therefore entirely proper to say that the Burlington is largely the product of consolidations and there is every reason to expect that the same natural tendencies will lead to future consolidations.



Internal Combustion Locomotive Being Tested in Service Between Petrograd ("Leningrad"), Russia, and Moscow

General News Department

Over 900 members of the Pennsylvania General Office Veteran Employees' Association, Philadelphia, went to Ocean City, N. J., on July 24, for their fourth annual outing. A special train was run for the accommodation of the party. Bathing, water sports, and other amusements were provided.

The Chicago, Burlington & Quincy has issued a 32-page illustrated booklet entitled "The Story of the Burlington," in which it describes the growth and development of the system since the granting of the charter on February 12, 1849. The booklet shows the investment of money in the road's construction and equipment and the acquisition of roads up to the present time. The livestock, coal and beet sugar industries along its lines are described as well as fast mail service and railroad land grants. In addition, the booklet describes ways in which the Burlington has aided farmers.

Hearings on D. L. & W. Derailment Abandoned

The public hearings on the derailment of a special passenger train on the Delaware, Lackawanna & Western near Hackettstown, N. J., on June 15 which were planned by the New Jersey Public Utilities Commission to begin at Newark, N. J., on June 24, have been abandoned. Personal inspection and testimony, of witnesses indicated, it is said, that all possible precautions had been taken to make operation of trains on this line safe and that the derailment was an "act of Providence."

In last week's *Railway Age* the number of dead from this accident was given as 44. Since that time 5 more of the injured have died, bringing the total to 49.

Boston & Maine to Improve Passenger Service

The Boston & Maine will increase the speed of passenger train service in several instances and add new trains to provide for heavy seasonal travel to the many resorts along its lines in a new time-table effective June 29.

Between Boston and Portland, Me., in both directions, certain trains are scheduled from 5 to 15 minutes faster than before. It is over this route also that the Boston & Maine Transportation Company is to establish shortly the first of the long distance high-way motor coach services announced some time ago. The effort to improve the advantages of travel by train by shortening the running time is noticeable also on other runs, trains between Boston and Concord, N. H., being scheduled from 3 to 8 minutes faster in some cases, with savings in time also between Boston and Manchester, N. H., and Boston and Nashua, N. H.

National Conference on Street and Highway Safety to Be Held in Washington

A Second National Conference on Street and Highway Safety is to be held at Washington, D. C., in November.

The 1924 conference adopted recommendations which were admittedly only the first step toward a national traffic policy, yet which had involved the work of nearly two hundred nationally known authorities on various phases of the traffic problem. In the preparations for the 1925 conference, Secretary Hoover has drawn together 130 more experts to consider recommendations which may be supplementary and more complete in their effect on traffic hazards and on the provisions for expediting traffic movement.

Two of the committees were continued over from the 1924 conference in order that the continuity of their work might not be interrupted and its value impaired. These were the Committee on Statistics and the Committee on Public Relations. The former brought to light the fact that data as to traffic accidents was either lacking completely or was so lacking in uniformity that a true picture of death and injury and of the damage of property could not be drawn. The latter was charged with the duty of co-

operating with public and private organizations in putting into effect the recommendations of the conference.

New committees have begun their work with special emphasis on what were considered by the 1924 conference matters of the greatest import. One of these is the Committee on Uniformity of Laws and Regulations, another the Committee on Law Enforcement, and a third the Committee on Metropolitan Traffic facilities. A fourth, the Committee on Causes of Accidents, will hold its first meeting in the near future.

P. R. R. Names More Freight Trains

The Pennsylvania announces that since it started, in April, to name its fast through freight trains, the best records of the company's history for promptness and regularity in this class of service have been made. So encouraging have been these results that 29 more trains are now to be named. It is believed that naming the trains arouses the employees' interest in them. Immediately after "WV-3," carrying all freight and making second morning delivery from Pittsburgh to Toledo, was christened the "Standard," it made a record of 57 consecutive days of perfect service. Eight other trains, after receiving names, made perfect performances for every trip in April and May.

The complete list of additional trains hereafter to be known by name follows:

"The Salesman"—Chicago to Buffalo, merchandise, fourth morning.
 "The Mascot"—Chicago to Pittsburgh, merchandise, third morning.
 "The Reliable"—Chicago to Columbus, perishable and merchandise, first evening.
 "The Colonel"—Chicago to Louisville, perishable and merchandise, first evening.
 "The Invincible"—Chicago to Cincinnati, perishable and merchandise, first evening.
 "The Trailblazer"—East St. Louis to Pittsburgh, merchandise, third morning.
 "The Thoroughbred"—Indianapolis to seaboard, livestock, third morning.
 "The Captivator"—Cincinnati to seaboard, perishable, third morning.
 "The Champion"—Pittsburgh to Wilkes-Barre, all freight, second morning.
 "The Premier"—Pittsburgh to seaboard, livestock, first afternoon.
 "The Flying Cloud"—Buffalo to Pittsburgh, all freight, second morning.
 "The Choc Cow"—Buffalo to Philadelphia and Jersey City, milk, first noon.
 "The Crackjack"—Buffalo to seaboard, all freight, second morning.
 "The Oriole"—Potomac Yard to New York, perishable, first morning.
 "The Ace"—Seaboard to Pittsburgh, all freight, second morning.
 "The Dividend"—From Wilkes-Barre to Pittsburgh, all freight, second morning.
 "The Purple Emperor"—Potomac Yard and Baltimore to Buffalo and Canada, all freight, second morning.
 "The Cat Bird"—Norfolk to Philadelphia and New York, perishables and merchandise, second morning.
 "The North Star"—Pittsburgh to Buffalo, all freight, second morning.
 "The Excelsior"—Buffalo to Chicago, all freight, fourth morning.
 "The Peerless"—Pittsburgh to Chicago, all freight, third morning.
 "The White Moth"—Seaboard to Lima, O., and Ft. Wayne, Ind., all freight, third afternoon.
 "The Valet"—Seaboard to Louisville, all freight, fourth morning.
 "The Challenger"—Cincinnati to Chicago, perishable and merchandise, first morning.
 "The Renown"—Louisville to Chicago, all freight, second morning.
 "The Vamp"—Cincinnati to Chicago, all freight, second morning.
 "The Lightfoot"—Columbus to Chicago, perishable, first morning.
 "The Home Run"—Seaboard to Chicago, empty refrigerator, tank and stock cars, sixth morning.
 "The Refiller"—Seaboard to East St. Louis, empty refrigerator, tank and stock cars, seventh morning.

L. & N., N. C. & St. L. and L. H. & St. L. Take Out \$150,000,000 Insurance for Employees

The Louisville & Nashville, the Nashville, Chattanooga & St. Louis, and the Louisville, Henderson & St. Louis have taken out a joint policy for the protection of 60,000 employees with the Prudential Insurance Company. This policy will total approximately \$150,000,000. The policy will become effective July 1, upon acceptance by 75 per cent of the employees. The amount of protection afforded each employee is based upon monthly earnings, the lowest being for \$1,000 and the maximum for \$3,000, with \$1,000 additional benefits in the event of death from accident. Benefits also are provided for loss of limb or sight, and in cases of total permanent disability.

Those employees earning less than \$100 a month will be

eligible for life insurance of \$1,000. For those whose earnings are over \$100 but not more than \$175 monthly there is a provision for \$2,000 protection, while all those earning more than \$175 monthly will be permitted to take \$3,000.

Each employee will contribute a uniform sum to the premium cost, but the railroads will defray the major part, and undertake the accounting and clerical work essential to the successful maintenance of the insurance.

Wage Statistics for March

For the month of March, 1925, Class I railroads reported to the Interstate Commerce Commission a total of 1,722,275 employees, a decrease of 3,091, or 0.2 per cent, as compared with the employment for the previous month. The total compensation increased \$14,305,872 or 6.4 per cent. This increase in compensation is due largely to the fact that March had three more working days than February. Compared with the returns for the corresponding month last year, the employment in March, 1925, shows a decrease of 2.2 per cent and the total compensation shows a decrease of 1.3 per cent.

NUMBER OF EMPLOYEES AT MIDDLE OF MONTH

Group	March, 1925	Increase over	
		Feb., 1925	March, 1924
Executives, officials and staff assistants...	16,488	6	203
Professional, clerical and general.....	281,443	269	(d) 2,154
Maintenance of way and structures.....	338,567	8,684	(d) 5,833
Maintenance of equipment and stores....	535,849	(d) 5,208	(d) 13,822
Transportation (other than train, engine and yard)	208,297	1,023	(d) 1,180
Transportation (yardmasters, switch tenders and hostlers).....	24,355	(d) 342	(d) 1,340
Transportation (train and engine service)	317,176	(d) 7,523	(d) 13,867
Total	1,722,275	(d) 3,091	(d) 37,993

The number of hours per working day was as follows:

Group	March, 1925	Increase over	
		Feb., 1925	March, 1924
Executives, officials and staff assistants	136,723	(d) 878	1,798
Professional, clerical and general.....	2,329,379	(d) 33,762	(d) 19,984
Maintenance of way and structures....	2,747,230	26,228	(d) 34,454
Maintenance of equipment and stores	4,414,545	(d) 124,140	(d) 133,744
Transportation (other than train, engine and yard)	1,847,044	(d) 46,152	(d) 9,889
Transportation (yardmasters, switch tenders and hostlers).....	226,886	(d) 10,585	(d) 13,261
Transportation (train and engine service)	2,799,424	(d) 253,956	(d) 199,492
Total	14,501,231	(d) 443,245	(d) 409,026

Contest to Reduce Rough Handling of Cars

As a further means of bringing about greater safety to trainmen as well as a reduction in claims resulting from damage to freight while in transit a special contest is to be conducted by the railroads in the Southern and South Atlantic states to determine which terminal can bring about the greatest decrease, during the month of July, in the amount of damage, both to equipment and freight shipments, due to rough handling of cars. Not only will such a campaign benefit the public but it will also bring about a saving of thousands of dollars to the carriers as the damage to equipment, which results when draft gears between cars "go solid in impact," is much greater than that to lading.

The contest will be under the general direction of a special committee on rough handling of the southeastern railroads, the chairman of which committee is G. L. Candler, assistant general manager of the Central of Georgia.

Three important yards on each of the larger roads in the south will be selected for these contests and the amount of damage in dollars and cents to cars and contents by rough handling will be carefully checked and recorded, the record to be based on the total number of cars handled in each of the yards named.

The cities in which the contest will be conducted follow:

- On the Central of Georgia—Savannah, Atlanta and Macon, Ga.
- On the Atlantic Coast Line—Rocky Mount and Savannah, Ga., and Jacksonville, Fla.
- On the Illinois Central—Jackson, Tenn., Jackson, Miss., and Fulton, Ky.
- On the Seaboard Air Line—Savannah, Georgia, and Jacksonville and Tampa, Fla.
- On the Atlanta & West Point and Georgia Railroads—Montgomery, Ala., Augusta, Ga., and Atlanta, Ga.
- On the Louisville & Nashville—Louisville, Ky., and Birmingham and Montgomery, Ala.

The Southern Railway will also participate but so far the three cities where the contest will take place have not been designated.

Traffic News

The Chicago & North Western has given notice that on August 1 its standard refrigerator cars will be placed on a mileage instead of a per diem basis.

The Chicago, Milwaukee & St. Paul has been authorized by the Interstate Commerce Commission to abandon 18 miles of branch line between Wausaukee, Wis., and Girard Junction.

In order to meet trolley, bus and private automobile competition, the Chicago & North Western on June 21 put into effect reduced Sunday excursion fares. The round trip excursion fare from Madison, Wis., to Chicago is \$2.75 compared with the regular fare of \$9.36; from Milwaukee to Chicago, \$2 compared with the regular round trip fare of \$5.14; from Boone, Iowa, to Omaha \$3 compared with \$11.04; from Clinton, Iowa, to Chicago \$2.75, compared with \$10.50 and from Green Bay, Wis. to Milwaukee, \$2.25, compared with the regular fare of \$8.10.

New Train to Mexico City

The International-Great Northern, the Missouri Pacific, and the Texas & Pacific, have established a train between St. Louis, Mo., and Laredo, Texas, to connect with a train of the Mexican National Railways for Mexico City, which reduces the schedule 11 hours. The train leaves St. Louis at 9:05 p. m., arrives in Laredo at 3:50 p. m. the third afternoon; it leaves Laredo at 6:30 p. m. and arrives in Mexico City at 6:10 a. m. the second morning following. Returning the train leaves Mexico City at 9 p. m., leaves Laredo at 8:45 a. m. on the second day, and arrives in St. Louis at 7:45 p. m. on the fourth day.

P. R. R. "Safe Drivers' Club"

A "Safe Drivers' Club" is being organized among the officers and employees of the Pennsylvania who are drivers of automobiles. The purpose of the club is to warn motorists to exercise proper care when approaching or driving over railroad-highway grade crossings, to prevent being struck by trains. To become a member one must agree to drive carefully, approach all railroad-highway crossings cautiously, and be assured that no train is approaching before crossing the tracks. A metal tag, bearing the slogan "Cross Crossings Cautiously," is furnished each member of the Safe Drivers' Club, to be attached to the rear license tag of his car, as a reminder to following motorists.

Changes in Price of Corn and Oats Not Affected by Freight Rates

Economic conditions and other factors are more important than freight rates in affecting the prices paid to the farmer for corn and oats during a period of 20 months, from August, 1923, to March, 1925, according to a study just completed by the Bureau of Railway Economics into the relationship of the prices of these commodities to transportation costs.

The detailed results of the study, according to the Bureau's bulletin, show:

- (1) That farm prices of corn and oats fluctuated widely during the whole period.
- (2) That freight rates were practically stationary throughout the same period.
- (3) That (a) Fluctuations occurred between different kinds and grades; (b) On the same reported grade at different points on the same day; (c) At the same point on different days; (d) On the same reported grade at the same point on the same day.
- (4) That the various fluctuations were many times the freight rates to representative markets.
- (5) That since freight rates were practically stationary they were not responsible for the wide fluctuations in prices, whether these fluctuations were upward or downward.

The study brings up to date and amplifies information shown in a bulletin issued in the early part of 1924. The bulletin shows prices at 77 points of origin for corn and 87 origin points for oats.

Commission and Court News

Interstate Commerce Commission

The commission has found not justified proposed increased charges for switching car load traffic proposed by the Birmingham Belt, a subsidiary of the St. Louis-San Francisco.

The commission has approved a proposed readjustment of rates on live and dressed poultry, butter and eggs from points in Kentucky, Tennessee, Alabama and Mississippi to eastern states and to the Buffalo-Pittsburgh zone but has found not justified a proposed readjustment of rates on the same commodities moving from Chicago to Ohio and Mississippi crossings and certain other destinations.

State Commissions

The Supreme Court of Arkansas on June 15 ruled that the Arkansas Railroad Commission was without power to force the Graysonia, Nashville & Ashdown to take over and operate portions of the Memphis, Dallas & Gulf, between Ashdown, Ark., and Shawmut.

Court News

Disregard of Fourth Section—

Damage Must Be Shown

The Circuit Court of Appeals, Fifth Circuit, holds that an action against a carrier for an alleged breach of section 4 of the Interstate Commerce Act by charging rates on certain shipments to Atlanta, Ga., exceeding in the aggregate the rates to intermediate points cannot be maintained without some allegation of special damage to the plaintiff. It appeared that many of the intermediate rates were only paper rates, wholly unused and involving points at which no business was done, or could be, on account of the want of unloading facilities.—*Patterson v. L. & N.* 2 Fed. (2nd) 592.

Validity of Release by

Workmen Using Railroad's Trains

An employee of a company which made an appliance which had been installed on an engine was killed by the explosion of the boiler of the engine while he was, for his employer's benefit, inspecting the appliance. He had executed a contract releasing the railroad from all damages resulting from riding on its engines and trains. The Circuit Court of Appeals, Sixth Circuit, holds that the release contract was a release from negligence, since whatever the deceased's status, there would be no liability to him except for negligence, and an agreement in the contract to observe the railroad employees' rules, did not affect the validity of the release.—*Allen v. Erie*, 2 Fed. (2nd) 712.

United States Supreme Court

Claims for Damages—Time-Limit

The Supreme Court of the United States holds that where a consignee made complaint to the Interstate Commerce Commission for reparation for a misrouted shipment after the expiration of the two year period prescribed for filing claims for damages, and the right to file his claim with the commission expired before the passage of the Transportation Act, 1920, the right was not revived by Sec. 206, par. f, of the act, and that, on the expiration of the two year period, it was as if liability had never existed. "Section 206 f will not be construed retroactively to create liability. To give it that effect would be to deprive defendant of its property without due process of law, in contravention of the Fifth Amendment."—*Wm. Danzer & Co. v. Gulf & Ship Island*. Decided June 8, 1925. Opinion by Mr. Justice Butler.

Foreign Railway News

Coal and Railway Labor Troubles Feared in England

Because of the severe depression in the British coal trade the British coal operators have given notice of termination of their agreement with the miners union on July 31 and will seek concessions in working agreements. The railways, also unfavorably affected by trade depression, have invited union representatives to a conference to discuss the reduction of operating expenses. It is not expected that the unions will take kindly to changed working conditions or lower wages and some concern is felt as to the successful outcome of the negotiations.

Results of European Railway Conference at Prague

At a conference of Continental European railway representatives at Prague during May, 1925, the following resolutions were adopted, according to Commercial Attaché Hodgson at Prague:

Beginning July 1, 1925, both the value of the shipment and the transportation costs may be collected from the consignee. The shipper may divert the consignment or alter the terms of payment at any time prior to the delivery of the shipment. Full or partial payment of the freight costs will be at the shipper's option, the remainder of a partial payment to be collected from the consignee. The states which participated in the conference agreed to apply the provisions of the Berne convention to all transit traffic of the signatory nations.

Mileage of the N. O. de M.

In the *Railway Age* of January 3 in an article concerning the railways of Mexico an error was made in the mileage ascribed to the Mexico Northwestern. This line extends from Ciudad Juarez in a southwesterly direction, terminating in the City of Chihuahua, and is 796.9 kilometers, or approximately 500 miles in length, including a branch 5 miles in length connecting with the Kansas City, Mexico & Orient Railway at Miñaca, and a branch 14 miles in length which extends from San Antonio to Cusihiuriachic. The Mexico Northwestern connects with the Kansas City, Mexico & Orient at Miñaca, and at Tabalaopa, and through traffic arrangements between the two companies, the Mexico Northwestern handles the Kansas City, Mexico & Orient traffic over that portion of the Mexico Northwestern from Tabalaopa to Miñaca.

Australian Gage Unification

Work has been started in Australia to link Brisbane, Queensland, and Sydney, New South Wales, with a railroad of uniform gage so that travelers will be able to make the trip without changing trains at the state border, as is necessary at present. Construction was commenced in January and will be completed in about two and one-half years, at an estimated cost of £3,500,000. The expense will be divided between the federal government and the state governments of New South Wales and Queensland, according to information received from Consul R. L. Rankin, Newcastle.

Unification of railway gages is one of Australia's great needs. The country was cut up into separate units, and not united into a commonwealth of states, when pioneer roads were established. Each unit was striving to work out its own destiny independent of the rest of the country, and consequently considerable rivalry existed. The large center in each unit felt that it would be advantageous to construct its railroads so that traffic would necessarily have to pass through it and not over the border to a rival trade center. Modern Australia, therefore, has a very complicated transportation situation. Passengers traveling from Brisbane down the east coast to Melbourne and across to Perth, on the west coast, a trip corresponding to a journey from Boston to Washington and across to San Francisco, must change cars seven times. Freight likewise must be transferred at each of these points. Aside from the inconvenience of travel under such conditions, the cost is greater, and considerable time is wasted in

making changes and connections. With freight the cost is almost prohibitive if more than one transfer is to be made.

The Australian Government for some years has been planning to standardize the gage of the different state roads, so that passengers or freight can pass from one end of the country to another without transfer, but the estimated cost of conversion has been so great that little headway has been made. A royal commission, appointed to look into the cost of unifying all the roads, reported after several months of investigation that it would be around £57,200,000. Aside from the great outlay required to make the different sections uniform, the authorities must contend with local prejudice, which is still strong in certain sections and will take time to overcome. The linking of Sydney with Brisbane, for example, is expected to divert a large amount of traffic from Sydney to Brisbane. Heretofore Sydney has been almost the sole market for the rich northern districts of New South Wales, but with the completion of the new link it is expected that Brisbane will become the trading center for this area. The conviction in this regard is so strong that towns in northeastern New South Wales are already constructing roads to connect with the new link.

The same situation doubtless will arise in other sections. Ports near the consuming areas and those with superior facilities for docking ships and handling cargo will profit at the expense of others where conditions are not so favorable. While the changes will establish new trade routes, and certain centers necessarily will suffer, the commonwealth as a whole should profit greatly. Through lower transportation costs producers will receive more for their products in over-sea markets, and for the same reason imported goods should cost the consumer less.

Traffic on Northern Railway of France During 1924

Receipts of the Northern Railway of France for 1924 aggregated 1,433,552,739 francs (about \$75,072,290), an increase of 204,835,665 francs over 1923, according to Consul P. C. Squire at Lille. The statement for the year indicates a reduced deficit, which might actually have been transformed into a surplus had the operation of the Paris suburban lines been less burdensome. Although the number of passengers carried increased from 150,000,000 to 154,000,000, the large number of commuters of suburban Paris who were transported at reduced rates accounted for an operating loss of 54,000,000 francs.

The operation of the Northern Railway, which indicated a shortage of 261,000,000 francs in 1921, 126,000,000 francs in 1922, and 180,000,000 francs in 1923, almost attains a balance for 1924. If the situation with respect to the Paris commuters could be remedied, it is probable that a surplus would result. The outlook on the whole is distinctly encouraging.

Uniform Accounting in Chinese Railway Shops

PEKING

The Chinese government railways have adopted uniform accounting for their shops. The charges have been divided into two categories, power and general. In shops where absence of electric or steam meters prevents accurate distribution of power costs, machines are to be given a horse-power rating and the use of such machines will be timed in the same manner as time is kept for labor. General charges and power charges are first debited to respective suspense accounts, which accounts are cleared by fixed rates per machine horsepower hour and fixed percentages on labor costs as jobs are completed. These rates and percentages are to be revised as necessary in order to maintain balances at a minimum, due allowance being made for seasonal fluctuations.

Foundry costs are treated similarly, the foundry suspense account being cleared as good castings are delivered at a uniform rate per pound or per kilogram. Articles manufactured for stock or for other departments may thus be priced on delivery, thus avoiding one of the most serious difficulties in Chinese material accounting. Due to the limited education of foremen in shops, assignment of workmen to jobs is to be accomplished by means of boards upon which job number is chalked, under which workmen's number checks are hung. Timekeepers will record these assignments four times daily, broken time to be estimated in consultation with foremen. An attendance record is made out by a similar process at the entrance gate and the two records, one in the shop and the other at the gate, are to be compared daily.

Equipment and Supplies

Locomotives

THE MCCLLOUD RIVER has ordered 2 Prairie type locomotives from the American Locomotive Company.

THE RICHMOND, FREDERICKSBURG & POTOMAC contemplates buying 2 Mountain type, 2 Pacific type and 2 switching locomotives.

THE NEW YORK CENTRAL is inquiring for 10 electric locomotives, Type T-2, for passenger service, with an option on the purchase of 10 more.

Freight Cars

THE TEXAS & PACIFIC is inquiring for 500 gondola cars.

THE ST. LOUIS SOUTHWESTERN is inquiring for 10 underframes for box cars.

CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for 400 steel underframes.

THE GREAT NORTHERN is inquiring for 250 general service cars of 50 tons' capacity.

THE FRUIT GROWERS EXPRESS has ordered materials for building 128 refrigerator cars in the shops at Portland, Oregon.

THE F. J. LEWIS MANUFACTURING COMPANY has given a contract to the American Car & Foundry Company for making repairs to 10 tank cars.

THE OHIO VALLEY REFINING COMPANY has ordered one triple-compartment, coiled, 8,000-gal. capacity tank car from the Standard Tank Car Company.

THE VIRGINIA-CAROLINA CHEMICAL COMPANY has ordered from the American Car & Foundry Company a 7,000-gal. tank to be mounted on old trucks.

THE SOUTHERN has ordered 1,000 steel center constructions from the Virginia Bridge & Iron Company. Inquiry for this equipment was reported in the *Railway Age* of June 13.

Passenger Cars

THE ALASKA RAILROAD is inquiring for 2 gasoline rail motor coaches.

THE NEW YORK, NEW HAVEN & HARTFORD contemplates buying from 25 to 35 motor cars.

THE BOSTON ELEVATED is inquiring for 100 double-truck, double-end, steel, convertible car bodies.

THE SEABOARD AIR LINE has ordered 12 all-steel dining cars from the Pullman Car & Manufacturing Corporation.

THE HAVANA CENTRAL is inquiring for 12 second-class passenger cars. This is in addition to the inquiry for 7 first-class coaches, reported in the *Railway Age* of May 30.

THE LONG ISLAND is having 2 baggage cars remodeled in the shops of the American Car & Foundry Company, to convert them into combination baggage and mail cars.

Iron and Steel

THE MAINE CENTRAL has received bids on 150 tons of steel for bridges.

THE CHESAPEAKE & OHIO is inquiring for 200 tons of steel for bridges.

THE ATLANTIC COAST LINE has ordered 600 tons of steel for a viaduct, from the Virginia Bridge & Iron Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered 115 tons of structural steel from the American Bridge Company.

THE GULF COAST LINES are inquiring for 1,400 tons of structural steel for six oil storage tanks for use at Houston, Texas.

THE NEW YORK CENTRAL has ordered 500 tons of structural steel for use in Millers, Ind., from the Ft. Pitt Bridge Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has ordered 140 tons of structural steel from the Louisville Bridge & Iron Company.

THE MOBILE & OHIO has ordered from the McClintic-Marshall Company about 1,600 tons of fabricated steel for shops at Jackson, Tenn.

THE CHICAGO, BURLINGTON & QUINCY has ordered two 80-ft. deck plate girder spans, constituting 115 tons, for use in Chicago, from the American Bridge Company.

Machinery and Tools

THE UNION PACIFIC has ordered one 200-ton locomotive hoist from the Whiting Corporation.

THE ILLINOIS CENTRAL has placed orders for 3 car wheel lathes and a 90-in. locomotive axle lathe.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has ordered one turret lathe from the Acme Machine Tool Company.

THE CHICAGO, BURLINGTON & QUINCY has ordered one 7½-ton electric traveling crane for its shops at West Burlington, Iowa, from the Continental Crane Company.

Miscellaneous

THE DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, is inquiring for one transformer car.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, June 29, for the requirements of the New York Central Lines east and west of Buffalo, of fuel oil, gasoline, kerosene, long time burning semaphor oil, turpentine substitute, coach candles, mineral seal oil, gas oil and lubricating oil.

Signaling

THE NEW YORK CENTRAL has placed an order with the E. A. Lundy Company for 844 Balkite signal rectifiers for use on various sections of the system.

THE BESSEMER & LAKE ERIE has ordered from the Union Switch & Signal Company a complete new set of locking for the existing 16-lever Saxby & Farmer machine at "BD" tower.

THE CHICAGO, BURLINGTON & QUINCY has placed an order with the E. A. Lundy Company for 1,589 Balkite signal rectifiers for use in connection with signal installations which will be operated by the a.c. floating battery system.

THE ILLINOIS CENTRAL has placed an order with the E. A. Lundy Company for one Matthews 6 k.v.a. full automatic gasoline electric set for use in connection with their train control work, to take care of emergency call requirements.

THE LOUISVILLE & NASHVILLE has placed an order with the E. A. Lundy Company for one Matthews 3 k.v.a. full automatic gaso-

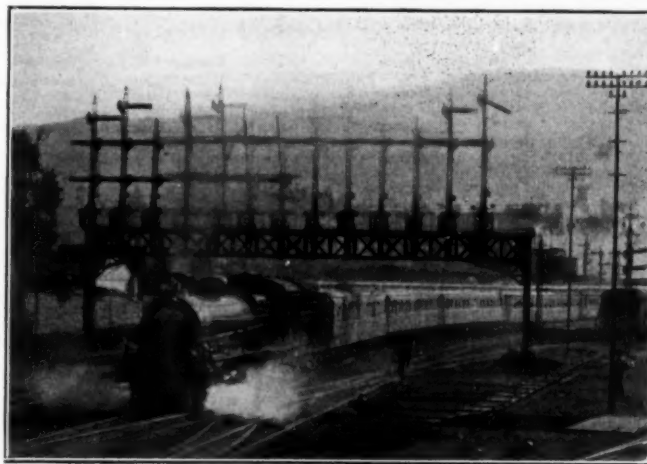
line electric sets for use in connection with their train control work, to take care of their emergency power requirements.

THE CHESAPEAKE & OHIO has bought materials from the Union Switch & Signal Company for 6 style "S-8" electric lever units with a supporting frame for mounting these on the existing 12-lever Saxby & Farmer interlocking machine in service at Gauley, W. Va.

THE BALTIMORE & OHIO has placed an order with the E. A. Lundy Company for 419 Balkite rectifiers together with the necessary transformers and power-off relays to equip 71 miles of double track with light signals between New Castle Junction, Pa., and Akron Junction, Ohio, and 35 miles of double track between Sterling, Ohio, and Greenwich.

THE PENNSYLVANIA has ordered materials from the Union Switch & Signal Company for a complete electro-mechanical interlocking machine for Lima, Ohio, having eight mechanical levers and eight style "S-8" electric lever units; also a 12-lever supporting frame with five style "S-8" electric lever units for application to the existing Saxby & Farmer machine at "BR" Cabin, Millbrook, Ohio; a new 16-lever supporting frame with 7 style "S-8" electric units for Liverpool, Ind., and an 8-lever supporting frame with three style "S-8" electric units for Wanatah, Ind.

THE READING COMPANY is extending the electro-pneumatic interlocking plant now installed at P. H. & P. Junction, Harrisburg, Pa., to take care of the track layout at Mulberry street, Harrisburg. The Mulberry street yard has heretofore been operated by an 80-lever mechanical interlocking machine and the new plan will provide for linking the functions of this layout up with the main Harrisburg interlocking so that one plant will operate the functions of both layouts. A 79-lever electro-pneumatic interlocking machine will handle the consolidated plant, which will involve the use of the A-1 type of switch movements with separately mounted cutoff valves. Color light signals are being used in the Mulberry street layout and an illuminated track model will be installed in the tower at P. H. & P. Junction to cover the entire layout controlled at this central point. The Union Switch & Signal Company has been given the contract for installing this work.



Prince of Wales' Special Train Leaving Capetown on His Recent Visit to South Africa

FREIGHT CAR REPAIR SITUATION

1924	Number freight cars on line	Cars awaiting repairs			Per cent of cars awaiting repairs	Month	Cars repaired		
		Heavy	Light	Total			Heavy	Light	Total
January 1.....	2,279,363	118,653	39,522	158,175	6.9	December	87,758	2,073,280	2,161,038
April 1.....	2,274,750	125,932	46,815	172,747	7.6	March	77,365	2,213,158	2,290,523
July 1.....	2,279,826	144,912	49,957	194,869	8.5	June	70,480	1,888,899	1,959,379
October 1.....	2,304,020	157,455	48,589	206,044	8.9	September	74,295	1,372,277	1,446,572
January 1, 1925.....	2,293,487	143,962	47,017	190,979	8.3	December	66,615	1,288,635	1,355,250
February 1.....	2,305,520	139,056	47,483	186,539	8.1	January, 1925.....	69,084	1,358,308	1,427,392
March 1.....	2,313,092	141,192	43,855	185,047	8.0	February	66,283	1,313,088	1,379,371
April 1.....	2,315,732	143,329	43,088	186,417	8.1	March	71,072	1,348,078	1,419,150
May 1.....	2,316,561	144,047	45,467	189,514	8.2	April	69,631	1,290,943	1,360,574

Data from Car Service Division Reports.

Supply Trade News

The E. A. Lundy Company, Pittsburgh, Pa., has opened an office at 611 Harrison building, Philadelphia, Pa., with P. M. Etters as district manager.

George T. Sinks, district manager of the Industrial Works, with headquarters in New York, has been appointed district sales manager of the McMyler Interstate Company, with headquarters in New York.

Thomas O'Leary, Jr., formerly with the New York Air Brake Company, is now a special representative of the general railroad department, Johns-Manville, Incorporated, with headquarters at 409 Dooly Block, Salt Lake City, Utah.

The Chicago Electric Company, 740 West Van Buren street, Chicago, has been appointed district representative, for the sale of American mono-rail cable conveyors in northern Illinois and northern Indiana, for the Conveyors Corporation of America, Chicago.

American Car & Foundry Company

American Car & Foundry Company reports for the fiscal year ending June 30, 1924, net earnings available for dividends \$6,164,104 as compared with \$6,304,967 in 1923. Selected items from the income statement follows:

	1924	1923
Earnings from all sources for the twenty-fifth and twenty-sixth fiscal year ending April 30—before deducting repairs, renewals, etc., as noted hereunder—and after making provision for taxes,....	\$9,781,085	\$10,786,574
Less: Renewals, replacements, repairs, new patterns, flasks, etc.	3,616,981	4,481,607
Net earnings	\$6,164,104	\$6,304,967
Less: Dividends—		
On preferred capital stock 7 per cent.....	\$2,100,000	\$2,100,000
On common capital stock.....	3,600,000	3,600,000
	\$5,700,000	\$5,700,000
Surplus earnings for the year.....	\$464,104	\$604,967

W. H. Woodin, president, in his remarks to stockholders treats of conditions in the railway supply market as follows:

"The buying of new equipment by the railroads during the year has been intermittent rather than steady. The rebuilding and repairing of old equipment has been appreciably less in volume than in prior years. Buying for foreign delivery has been in small volume. Competition in all branches of the Company's activities has been no less keen than heretofore—with a resulting narrow profit margin. An important factor in the production of the year's earnings has been the business done in the manufacture and sale of the company's miscellaneous products.

"The company enters upon its new year with a fair amount of business on its books. It may reasonably be expected that before the close of the year now current, buying by the railroads will be resumed in increased volume, and that the company will obtain its full share of such business.

"Apparently we are to have what is so much to be desired—a quiet, methodical and businesslike administration of our national affairs. Among other things, it seems now quite likely that the Congress which will assemble in December next will give to us some measure of relief from the intolerable burden of taxation under which the industries of the country and its citizens have so long suffered.

"Also there are indications of the disappearance of the numerous congressional 'bloes,' which so seriously hampered the enactment of constructive and remedial legislation during the last congressional session—and with the disappearance of that element in our national legislation it is probable that the problems of the railroads will be dealt with sanely, and the roads given the support and relief to which they are justly entitled and without which they cannot adequately discharge their functions as one of the chief factors in the development and maintenance of the national prosperity."

Obituary

John H. Hayward, vice-president and treasurer of the Hayward Company, New York, died in Teaneck, N. J., on June 14. Mr. Hayward was born on April 7, 1847, in New York. After graduating from a military academy he served with the Manhattan Savings Institution, and later went into the produce business. Mr. Hayward subsequently became general manager of the Manhattan Dredging & Elevating Company, which was organized to carry on a general contracting business. Later he organized the Hayward Company for the manufacture of orange peel buckets and other types of buckets.

Railway Construction

ATLANTIC COAST LINE.—This company has filed an application with the Interstate Commerce Commission for the construction of an extension in Collier county, Fla., from a connection with its branch line at Immokalee to Deep Lake, a distance of 27 miles.

BALTIMORE & OHIO.—Bids were closed on June 26, for the construction of a water treating plant at Lumberport, West Va.

CENTRAL PACIFIC.—This company has requested permission from the Interstate Commerce Commission to construct a new line from near Klamath Falls, Ore., to near Cornell, Calif., a distance of 40 miles. The applicant states that the project forms a part of the general plan for the development of southern Oregon and north eastern California. The line when built will provide a through route connecting the Central Pacific lines in Oregon with its main line running between San Francisco and Ogden.

ERIE.—This company will convert its Monmouth street, Jersey City, coach yard into a team track yard and will build at Weehawken, N. J., a new coach yard. The company has acquired a portion of the warehouse property, adjoining its right of way in Jersey City, owned by the Safety Car Heating & Lighting Company. It has other large holdings in the vicinity and plans ultimately an extensive terminal warehouse development on the property, which is located at the New Jersey entrance to the Hudson river vehicular tunnels, now nearing completion.

KANSAS CITY SOUTHERN.—The Interstate Commerce Commission has authorized this company to construct 0.65 mile of line in Kansas City, Kans., at an estimated cost of \$23,937, to give it an improved connection with the Kansas & Missouri Railway & Terminal, which it controls.

LOS ANGELES JUNCTION.—This company and the Central Manufacturing District, Inc., have been authorized by the Interstate Commerce Commission to construct and operate a line in Los Angeles, Calif.

MISSOURI PACIFIC.—Bids were closed on June 26, for the construction of a 6-stall roundhouse at Bush, Ill.

NORTHERN PACIFIC.—The construction of a branch line from Orofino, Idaho, into the Clearwater Timber district is contemplated. A definite location has not yet been made nor has the approximate cost been determined.

ST. LOUIS-SAN FRANCISCO.—This company in conjunction with the Missouri Pacific asked for bids on a joint passenger station at Hoxie, Ark.

UNION PACIFIC.—This company contemplates the construction of a passenger station and also freight station facilities at Topeka, Kansas.

UNION PACIFIC.—The California Railroad Commission has authorized the construction of an underpass beneath the tracks of the railroad at Montebello, Cal. The roadway is to be 61 ft. wide and the expense is to be shared by the state, county and railroad.

UNION PACIFIC.—Bids will be received until July 14, for the construction of a passenger station and freight station at Topeka, Kan.

WABASH.—This company has asked for bids on a passenger station at Attica, Ind.

WABASH.—The contract has been awarded to Roberts & Schaefer Company for the construction of a reinforced concrete automatic electric simplex roller ship bucket locomotive coaling and sanding plant at St. Louis, Mo., a 300-ton four track installation at Bement, Ill., and a 200-ton track coaling station at Tracy, Iowa.

Railway Financial News

ALBANY TERMINAL.—Stock.—The Albany (Ga.) Passenger Terminal Company has applied to the Interstate Commerce Commission for authority to increase its capital stock from \$15,000 to \$125,000 by issuing 1,100 shares at \$100 each. The proceeds will be used to enlarge the company's facilities at Albany, Ga., estimated to cost \$110,020. The stock will be offered to proprietary companies in proportion to the use made by them of the station.

ATLANTIC COAST LINE.—Control of Subsidiary Company.—The Atlantic Coast Line has been authorized by the Interstate Commerce Commission to acquire control of the Moore Haven & Clewiston by purchase of all of the 500 shares of outstanding capital stock and to lease the property for a term of 99 years. The Moore Haven & Clewiston was completed in 1921 and extends from Moore Haven, Fla., to Clewiston, 14 miles, paralleling the southern shore of Lake Okeechobee.

BALTIMORE & OHIO.—New Director.—Delos W. Cooke has been elected a director to fill the vacancy caused by the resignation of Charles A. Peabody.

BOSTON & MAINE.—Brief on Branch Line Abandonments.—The Boston & Maine has represented in a brief filed with the Interstate Commerce Commission that its unprofitable branch lines in New Hampshire and Massachusetts which it has requested authority to abandon, are a serious handicap on the efforts of the system to earn a fair return. Operation of the New Hampshire branches in question, imposes a financial burden on the carrier amounting to \$250,000 a year and a larger amount in Massachusetts, according to the company. The branches were built for competitive or other reasons and their existence, the Boston & Maine contends, no longer is justified as the population and the industries served by them have shown a marked decline. The Boston & Maine in the brief expresses its willingness to turn over the lines to protestants to continue their operation but informs the commission that furnishing of substitute motor service by the railroad and the availability of other rail lines will minimize any local inconvenience. The heavy losses of these lines, according to the carrier, make the issue of public convenience and necessity of broad concern and it is suggested that the commission must weigh the "public convenience and necessity" of the protesting localities against that of the larger community.

CAMBRIA & INDIANA.—Valuation.—A tentative valuation of \$3,800,000 has been placed by the Interstate Commerce Commission on the owned and used property of the Cambria & Indiana as of June 30, 1918. The road's capitalization on valuation date was \$4,641,005. Book investment in road and equipment was reported as \$5,452,586, which the commission's report readjusts to \$5,583,788. The cost of reproduction new and cost of reproduction less depreciation of all common-carrier property, other than land and material and supplies wholly owned and used are \$4,062,992 and \$3,569,247 respectively.

CHESAPEAKE & OHIO.—Annual Meeting.—The annual meeting of the Chesapeake & Ohio, which was adjourned from April 21, 1925, on the request of the minority stockholders, was held as scheduled on June 23. The representatives of the minority stockholders asked that the meeting be further postponed but this was deemed inadvisable by the majority stockholders representing 548,254 shares as against 131,884 shares held by the minority. This vote is stated by the company as showing a loss of 11,439 shares by the minority and a gain of 41,712 shares by the majority since the special meeting of the stockholders was held on March 30, 1925. The action taken consisted of the approval of the actions of the board of directors since the last annual meeting and approval of the leases of the Ashland Coal & Iron, the Long Fork and the Millers Creek railroads. Directors were re-elected.

CHICAGO, KALAMAZOO & SAGINAW.—Valuation.—A tentative valuation of \$1,117,635 has been placed on the used property of the Chicago, Kalamazoo & Saginaw as of June 30, 1918. The

owned property figure is \$1,249,635 and wholly owned and used \$1,117,635. Capitalization, on date of valuation was \$1,718,000, and book investment in road and equipment \$1,267,252. The cost of reproduction new of the used property is estimated at \$1,177,163 and of the used property less depreciation, \$896,824.

CHICAGO, MILWAUKEE & ST. PAUL.—Abandonment of Branch.—The Interstate Commerce Commission has authorized this company to abandon a portion of a branch in Marinette County, Wis., between Wausaukee on the Superior division northwesterly to Girard, 17.25 miles. The population of the region traversed by the branch is estimated to be about 700. The records show that the tonnage handled declined from 106,886 in 1918 to 1,681 in 1922, due chiefly to cessation of lumbering operations. It was also shown in the records that there was little prospect of any material increase in the tonnage in the near future. The proposed abandonment was opposed by the Wisconsin Railroad Commission.

CHICAGO, MILWAUKEE & ST. PAUL.—Receivers' Views on Rate Structure.—The receivers of the Chicago, Milwaukee & St. Paul have made the following statement in response to inquiries regarding the prospective income situation of the property and their attitude respecting a rate increase:

As is well known, there is urgent need for a readjustment of the rate structure so as to improve the income showing of carriers in the western district. Conditions are particularly acute for lines like the St. Paul, which because of the character and volume of their traffic have suffered disproportionately from the changes that have taken place in the relation between rates and costs of operation. The return on investment enjoyed by the northwestern carriers is substantially below that of carriers in other parts of the country. The receivers have joined the other carriers in requests for rate increases. There is, of course, involved not merely the question as to what the rate increase should be, but how it should be made. Careful study has been given to this subject. In view of the fact that the present and prospective needs of the carriers vary because of conditions forced upon them and over which they have no control, respecting both costs and rates, it is obviously desirable in connection with any rate readjustment to have regard for the several and varying needs of the carriers. Regard for the shippers also suggests this course in order that the burden on shippers shall not be needlessly heavy. The study which the receivers have made has led them to the conclusion that any rate increase should be made so that the proceeds of it would go to the lines that need it, and not unduly swell the revenues of carriers that do not show similar need. This could be accomplished by segregating and pooling the proceeds of the increase throughout the district and distributing the same among all carriers in proportion to their showing of deficit below the fair return, which is the aim of the transportation act.

Accepting book investment as the amount upon which a fair return is to be calculated, until properties have been definitely valued by the commission, the carriers in the western district during the year 1924 fell short in the aggregate to the extent of approximately \$180,000,000 of earning the fair return which has been fixed by the commission at 5 3/4 per cent. The deficit on the St. Paul was approximately \$23,000,000, which is 12.76 per cent of the aggregate group deficit. It would, therefore, seem to be just that the St. Paul should be credited with this percentage of any amount raised as a result of rate increase designated to meet the needs of the several carriers. If an increase of only 5 per cent had been in effect during the year 1924 and the proceeds thereof had been so segregated and distributed, the net operating income of the St. Paul would have been increased upwards of \$10,000,000 to an amount in excess of \$29,000,000. The result would have been to increase the percentage return on book investment from 2.59 to 4.02. Such an increase thus dealt with would have increased the net operating income of all carriers in the western group earning less than 5 3/4 per cent in degrees varying according to their needs as reflected by the percentages of the total group deficit which each line suffered. To illustrate: The net railway operating income of the Chicago & North Western would have increased from approximately \$16,780,000 to \$22,195,000, increasing its return on investment from 3.36 to 4.44. The Northern Pacific would have enjoyed an increase of \$5,945,000, in round numbers, to a percentage increase of return on investment from 3.46 to 4.50. All of the carriers would have benefited except those already earning more than 5 3/4 per cent, the amount of benefit in each case depending on carrier need as reflected by deficit percentages.

An increase, the proceeds of which would be segregated and distributed in the manner suggested, would seemingly be far more beneficial to the carriers of the district as a whole than a larger increase not thus segregated and distributed in accordance with carrier needs. Obviously, the former method would materially lighten the burden on shippers. In fact the study of the receivers indicated that a 5 per cent increase segregated and distributed in the manner suggested would be more beneficial than a 10 per cent increase not thus distributed, a large portion of which would go to carriers already enjoying ample return and which perhaps under the rate making scheme of the transportation act are not equitably entitled to any increase.

It is, therefore, the position of the receivers that there should be a rate increase, the proceeds of which would be pooled and distributed according to the carrier needs. While the course suggested represents a distinct departure from the practice that has heretofore prevailed in rate making, it would appear that to so segregate and distribute the proceeds of a rate increase would not only be just to carriers and shippers, but would agree with the letter and spirit of the rate making provisions of the transportation act, which declared the aim to be to obtain revenues essential to the needs of the different carriers without increasing the revenues of others whose returns are ample. A rate increase, the proceeds of which would be so dealt with would also seem to agree with the purpose of the rate making provisions of the transportation act as they have been interpreted by the courts. It is the view of the receivers that to adopt the method suggested would be far-reaching in its effect towards solving the so-called railway problem in the manner fairest to all concerned and insure the carrying out of the purpose and spirit of the transportation act.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Tentative Valuation.—A tentative valuation of \$86,734,107 has been placed by the Interstate Commerce Commission on the used property of the

Chicago, St. Paul, Minneapolis & Omaha, as of June 30, 1917. The figure placed on the property owned by the carrier is \$86,710,600 and on property wholly owned and used for common carrier purposes \$86,691,200. Outstanding capitalization as of valuation date was reported as \$71,205,945. The book investment in road and equipment was \$77,877,936, which the commission's report increases to \$84,827,587. The cost of reproduction new of the used property was estimated at \$86,957,887 and of the used property less depreciation at \$68,033,814. Cost of reproduction new of the owned property was estimated at \$86,958,395; less depreciation \$68,033,975. Cost of reproduction of the wholly owned and used property was given as \$86,423,468; less depreciation \$67,564,548.

COUDERSPORT & PORT ALLEGANY.—Abandonment.—The Coudersport & Port Allegany has been granted permission by the Interstate Commerce Commission to abandon a line between Newfield Junction and Ulysses, Potter County, Pa., a distance of 6.64 miles.

DELAWARE & HUDSON.—B. R. & P. Lease.—The board of managers on June 24 approved the lease of the Buffalo, Rochester & Pittsburgh for a term of 999 years. The directors of the Buffalo, Rochester & Pittsburgh approved the lease on May 1. Stockholders have not yet met.

DETROIT & HURON.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for common carrier purposes at \$260,000.

DETROIT CONNECTING.—Project.—The Detroit Connecting Railroad has filed with the Interstate Commerce Commission a supplemental application setting forth a new plan of financing the project and including petitions of numerous manufacturing concerns in the district affected. The company proposes to change its present authorized capital stock of \$500,000 common to 180,000 shares, no par common, and \$6,000,000 non-cumulative 7 per cent preferred; to issue \$3,000,000 of first mortgage 6 per cent gold bonds due in 30 years, and to issue \$500,000 in equipment trust notes due in five years.

FLORIDA EAST COAST.—Certificates.—The Florida East Coast has requested of the Interstate Commerce Commission authority to assume obligation and liability for \$1,350,000 of 4½ per cent equipment trust certificates to be sold at not less than 95½ per cent of par. The certificates will be issued by the Bankers Trust Company under date of August 1 next, and will mature in 15 annual installments of \$90,000 commencing August 1, 1926.

FORT SMITH & WESTERN.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1919, placing the final value for rate-making purposes of the property owned and used for carrier purposes at \$4,908,300.

GRAND TRUNK MILWAUKEE CAR FERRY.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for common carrier purposes at \$625,000.

GULF, MOBILE & NORTHERN.—1924 Earnings.—Annual report for 1924 shows net income after charges of \$1,122,223 as compared with \$940,497 for 1923. Selected items from the income statement follow:

GULF, MOBILE & NORTHERN			
	1924	1923	Increase or decrease
Average mileage operated.....	465.95	465.95	
Total railway operating revenues.....	\$6,088,030	\$5,944,549	\$143,481
Maintenance of way.....	\$948,756	\$907,224	\$41,532
Maintenance of equipment.....	1,014,371	1,020,982	—6,611
Transportation.....	1,886,358	2,110,081	—223,722
Total operating expenses.....	\$4,366,287	\$4,459,952	—\$93,665
Operating ratio.....	71.72%	75.03%	
Net revenue from operations.....	\$1,721,743	\$1,484,597	\$237,147
Railway tax accruals.....	344,192	326,644	17,549
Equipment rents, net.....	Dr. \$194,952	Dr. \$236,285	\$41,333
Joint facility rents, net.....	31,880	33,796	—1,915
Net railway operating income.....	\$1,211,976	\$955,307	\$256,669
Total non-operating income.....	88,634	144,290	—55,657
Gross income.....	\$1,300,610	\$1,099,597	\$201,013

Rent for leased roads.....	\$33,750	\$33,750	
Interest on funded debt.....	123,023	125,172	—2,149
Total deductions from gross income...	\$178,387	\$159,101	\$19,287
Net income.....	\$1,122,223	\$940,497	\$181,726

ILLINOIS CENTRAL.—Bonds.—The Illinois Central and the Chicago, St. Louis & New Orleans have been authorized by the Interstate Commerce Commission to issue \$7,094,000 of their joint first refunding mortgage 5 per cent bonds, series A. The bonds when authenticated are to be delivered by the trustee to the New Orleans and in turn to the Central in payment of advances. The bonds will be sold by the Central at not less than 97.5 per cent of par. The bonds are being sold to the public by Kuhn, Loeb & Co.

INTERNATIONAL BRIDGE.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for common carrier purposes at \$975,000.

JACKSONVILLE TERMINAL.—Bonds.—The Jacksonville Terminal Company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of refunding and extension mortgage bonds to be sold to J. P. Morgan & Co., at a price which will produce not less than 98 per cent and interest, or on approximately a 5.10 per cent basis. No contract for sale of the bonds has been made. The proceeds will be used for improving applicant's terminal facilities.

LEHIGH VALLEY.—Fight for Control.—Interest in financial centers this week was directed at a report that the New York Central and the Delaware & Hudson were at a deadlock in a contest wherein each is said to be seeking control of the Lehigh Valley. Reports stated that the New York Central and the Delaware & Hudson had each secured between 20 and 25 per cent of the stock.

MORRIS & ESSEX.—Bonds.—Stockholders of the Morris & Essex, which is leased by the Delaware, Lackawanna & Western, approved on June 24 a directors' resolution to issue \$35,000,000 mortgage bonds. Of the total, \$11,582,000 will be delivered to the Lackawanna in reimbursement of capital expenditures.

NEW YORK, PHILADELPHIA & NORFOLK.—Valuation.—A final value for rate-making purposes of \$11,200,000 has been found by the Interstate Commerce Commission for the property of the New York, Philadelphia & Norfolk owned and used for common carrier purposes, as of June 30, 1915. Capitalization of the company as of valuation date was reported as \$11,888,375. The book investment in road and equipment totaled \$10,533,161, which the commission's report readjusts to \$12,077,930. The cost of reproduction new and cost of reproduction less depreciation of common-carrier property, other than land, wholly owned and used were ascertained as \$11,535,313 and \$8,821,973 respectively.

ORANGE & FREDERICKSBURG.—Acquisition.—The Orange & Fredericksburg, recently incorporated in Virginia, has applied to the Interstate Commerce Commission for authority to take over and operate the Potomac, Fredericksburg & Piedmont. The line extends between Fredericksburg and Orange, Va., 37 miles.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—Abandonment of Branch.—The Interstate Commerce Commission has issued a certificate authorizing this company, which is leased by the Pennsylvania, to abandon a portion of its Greene County coal branch between Superior Junction, Ind., and Dugger, a distance of 0.93 miles.

RIO GRANDE & EAGLE PASS.—Abandonment.—The Interstate Commerce Commission has granted authority to this company to abandon its Minerva station in Webb County, Tex., and 8,000 ft. of track to the southeast.

ST. CLAIR TUNNEL.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for common carrier purposes at \$1,600,400.

SAN DIEGO & ARIZONA.—Notes.—The San Diego & Arizona has requested of the Interstate Commerce Commission authority to renew two 6 per cent promissory notes for \$688,818 payable to

the Southern Pacific Company and the J. D. & A. B. Spreckels Securities Company and to issue and sell to the proprietary companies two additional notes for \$135,660 each, bearing no interest, to the same companies.

ST. LOUIS-SAN FRANCISCO.—Abandonment of Branch.—The St. Louis-San Francisco and the Kansas City, Fort Scott & Memphis have requested permission of the Interstate Commerce Commission to abandon the Rich Hill branch extending from Linton, Linn County, Kans., to Rich Hill, Bates County, Mo., a distance of 21 miles.

ST. LOUIS SOUTHWESTERN.—1924 Earnings.—Annual report for 1924 shows net income after charges of \$2,365,162, equivalent after allowance for 5 per cent preferred dividends to \$8.37 a share on the outstanding \$16,356,100 common stock. Net income for 1923 was \$3,401,092, equivalent after preferred dividends to \$14.71 a share. Selected items from the income statement follow:

ST. LOUIS SOUTHWESTERN			
	1924	1923	Increase or decrease
Average mileage operated.....	1,777.01	1,775.85	1.16
Railway operating revenues.....	\$26,326,291	\$29,551,120	—\$3,224,829
Maintenance of way.....	\$4,232,984	\$4,251,897	—\$18,913
Maintenance of equipment.....	5,878,093	6,798,326	—920,233
Transportation.....	7,770,502	8,984,543	—1,214,041
Total operating expenses.....	\$20,027,914	\$21,990,212	—\$1,962,298
Net revenue from operations.....	\$6,298,377	\$7,560,908	—\$1,262,531
Railway tax accruals.....	1,286,014	1,630,624	—356,354
Railway operating income.....	\$5,007,402	\$5,924,429	—\$917,026
Equipment rents.....	\$5,756	\$7,287	—\$1,531
Joint facility rents.....	698,396	775,001	—76,606
Net railway operating income.....	\$4,741,012	\$5,630,285	—\$889,273
Non-operating income.....	317,936	329,414	—11,478
Gross income.....	\$5,058,948	\$5,959,699	—\$900,751
Interest on funded debt.....	\$2,649,714	\$2,522,425	\$127,289
Total deductions from gross income...	\$2,693,786	\$2,558,607	\$135,179
Net income.....	\$2,365,162	\$3,401,092	—\$1,035,930
Income applied to sinking funds.....	\$7,800	\$291,673	—\$283,873
Income appropriated for investment in physical property.....	334,000	107,939	226,061
Income appropriated for annuity trusts.....	18,043	52,871	—34,828
Total.....	\$359,843	\$452,483	—\$92,639
Surplus for year carried to profit and loss.....	\$2,005,319	\$2,948,610	—\$943,291

TOLEDO, SAGINAW & MUSKOGON.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for common carrier purposes at \$1,439,000.

Dividends Declared

Baltimore & Ohio.—Common, 1¼ per cent, quarterly; preferred, 1 per cent, quarterly; both payable September 1 to holders of record July 18.

Great Northern.—Preferred, 2½ per cent, payable August 1 to holders of record June 26.

Gulf, Mobile & Northern.—Preferred, 1½ per cent, quarterly, payable August 15 to holders of record August 1.

Kansas City Southern.—Preferred, 1 per cent, quarterly, payable July 15 to holders of record June 30.

Missouri-Kansas-Texas.—Preferred A, 1¼ per cent, quarterly, payable August 1 to holders of record July 15.

Norfolk & Western.—Common, \$1.75, quarterly, payable September 19 to holders of record August 31. Preferred, \$1, quarterly, payable August 31 to holders of record July 31.

Philadelphia & Trenton.—2½ per cent, quarterly, payable July 10 to holders of record July 1.

Pittsburgh, Cincinnati, Chicago & St. Louis.—Preferred, 2 per cent, payable July 20 to holders of record July 20.

United N. J. R. R. & Canal Cos.—2½ per cent, quarterly, payable July 1 to holders of record June 21.

Wabash.—Preferred A, 1¼ per cent, payable August 25 to holders of record August 10.

Trend of Railway Stock and Bond Prices

	June 23	Last Week	Last Year
Average price of 20 representative railway stocks.....	79.63	80.13	66.45
Average price of 20 representative railway bonds.....	91.31	91.38	87.14

Railway Officers

Executive

E. M. Harter and **Clifford Hubbell** have been appointed the successor receivers of the Dansville & Mount Morris succeeding the late Ambrose S. Murray, Jr., with headquarters at Dansville, N. Y.

A. J. County, vice-president of accounting and corporate work of the Pennsylvania, on July 1 will also take over the duties of the vice-presidency of the treasury, relinquished by the retirement on May 1 of Vice-president Henry Tatnall.

Henry Blakeley, assistant vice-president in charge of traffic of the Northern Pacific, whose recent retirement was reported in the *Railway Age* of June 6, was born on November 27, 1854,

and was graduated from the University of Minnesota in 1873. He also attended the Rensselaer Polytechnic Institute, Troy, N. Y., in 1873 and 1874. He entered railway service in 1888 as a clerk in the freight department of the Northern Pacific and was later promoted successively to chief clerk, secretary to the general traffic manager, division freight agent and assistant general freight agent. Mr. Blakeley was promoted to general western freight agent in August, 1905, and held that position until December, 1913,



Henry Blakeley

when he was promoted to general freight agent, with headquarters at St. Paul. He was promoted to freight traffic manager in January, 1921, and held that position until March, 1924, when he was promoted to assistant vice-president in charge of traffic. Mr. Blakeley continued in that capacity until his recent retirement.

Operating

R. E. Hallawell has been appointed transportation inspector of the Southern Pacific, with headquarters at San Francisco, Calif.

O. F. Brookmeyer, superintendent of passenger transportation of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Indianapolis, Ind., has resigned to engage in other business.

F. H. Crump, assistant superintendent of the Kettle Valley, with headquarters at Penticton, B. C., has been promoted to superintendent, with the same headquarters, succeeding **A. McCulloch**, who is now general superintendent and chief engineer.

F. N. Melius has been appointed general superintendent of the New York Terminal district of the New York Central and the Ottawa & New York, with headquarters at New York, succeeding **F. E. Williamson**, resigned to enter the service of another company.

Thomas Baird, supervisor of transportation of the Southern district of the Southern Pacific, with headquarters at Los Angeles, Cal., has been transferred to the Northern district, with headquarters at Sacramento. **L. Kocher** has been appointed supervisor of transportation of the Southern district, with headquarters at Los Angeles, succeeding Mr. Baird.

Spates Sherwood Brooks, who has been appointed superintendent of the Southern, with headquarters at Knoxville, Tenn., was born in that city on August 1, 1887. He attended public and private elementary schools, Maryville College and the University of Tennessee. He entered railway service in 1902 as a telegraph operator for the Southern on its Knoxville division. In 1906 he was promoted to train dispatcher, and, in 1915, to assistant chief dispatcher. He became chief dispatcher in 1919 and trainmaster in 1923, in which latter position he was serving at the time of his recent promotion.

Robert M. Smith, who has been appointed superintendent of the New York, New Haven & Hartford, with headquarters at New London, Conn., was born in Montgomery, Ala., on January 22, 1877, and attended school in Northumberland, Pa. He went to New England as a young man and in 1898 entered the service of the New York, New Haven & Hartford as a yard brakeman at Norwich, Conn. Six months later he was promoted to yard conductor, and in 1901 he was promoted to freight conductor. Three years thereafter he was advanced to passenger conductor and remained in that capacity until 1917, when he was appointed assistant trainmaster of the New London division, with office at Putnam, Conn. In September, 1918, he was promoted to trainmaster of the same division, and later to assistant superintendent. In this position he was serving at the time of his recent promotion to superintendent of the New Haven and New London divisions.



R. M. Smith

Humphrey A. Moynihan, who has been promoted to superintendent of the Old Colony division of the New York, New Haven & Hartford, with headquarters at Taunton, Mass., was born on February 6, 1877, and began his railroad career as a telegraph operator on the Erie in 1893. A few months later he entered the employ of the Delaware, Lackawanna & Western as a laborer, and served in that capacity for about a year, when he went with the New York Central as a towerman. He remained in this position until 1899, when he resigned to become an operator and dispatcher for the Delaware, Lackawanna & Western. In 1900-01 he served the Erie as an operator and for a short time as a yardmaster, and then re-entered the employ of the Delaware, Lackawanna & Western as a maintenance of way clerk. In 1903 he became a clerk in the general office of the Erie, and the following year entered the employ of the New York, New Haven & Hartford as an operator, being promoted shortly thereafter to dispatcher. In 1907 he was promoted to general yardmaster, and in 1913 went with the Boston & Maine in the same capacity, returning again to the New Haven in 1915. Three years later he was promoted to trainmaster on the Central New England, and in 1920 became assistant super-



H. A. Moynihan

intendent of this line, with headquarters at Maybrook, N. Y., in which capacity he was serving at the time of his recent promotion.

Traffic

James E. Weller, freight traffic manager of the Pennsylvania at Chicago, has been promoted to assistant traffic manager, with offices in the same city. **J. T. Johnston**, freight traffic manager at St. Louis, has been transferred to the same position in Chicago, as successor to Mr. Weller.

W. J. Moore, assistant general freight agent of the New York Central, with headquarters at New York, has resigned to engage in other business. **F. C. Jerome** has been appointed assistant general freight agent to succeed Mr. Moore, and **R. J. Hopper** has been appointed general eastern freight agent, succeeding Mr. Jerome. **W. R. Dallow** has been appointed division freight agent to succeed Mr. Hopper.

E. B. Finegan, general freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been promoted to assistant freight traffic manager, with the same headquarters. **J. H. Skillen**, general agent in the freight department, with headquarters at Chicago, has been promoted to assistant freight traffic manager with the same headquarters. **E. W. Soergel**, assistant to the traffic manager has been appointed general freight agent with headquarters at Chicago, succeeding Mr. Finegan and the position of assistant to the traffic manager has been abolished.

Mechanical

Frank H. Becherer has been appointed assistant to the mechanical superintendent of the Boston & Maine, with headquarters at Boston, Mass., succeeding **Daniel A. Smith**, who has been assigned to other duties.

P. J. Colligan, superintendent of motive power of the Second district of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., has been appointed superintendent of shops at Silvis, Ill., succeeding **S. W. Mullinix**, deceased.

Engineering, Maintenance of Way and Signaling

Reuben Hayes, who has been appointed engineer, maintenance of way, of the southwestern district of the Southern, with headquarters at Chattanooga, Tenn., was born on September 14, 1884, at Madbury, N. H. He was graduated from Dartmouth College and the Thayer School of Engineering—from the latter institution in 1908. He entered railway service three years later as an assistant engineer in the office of the chief engineer, maintenance of way and structures, of the Southern. In 1916 he became resident engineer in charge of field construction of terminal facilities at Alexandria, Va., and Hayne, S. C. In 1917 he was appointed structural engineer, with headquarters at Washington, and remained in that position until the time of his recent promotion.

Purchasing and Stores

C. J. Pearce has been appointed division storekeeper of the Shasta division of the Southern Pacific, with headquarters at Dunsmuir, Cal., succeeding **F. L. Doss**, promoted.

Obituary

James D. Tyter, retired general superintendent of the Boston & Maine, died at his home in Cambridge, Mass., on June 19, following a long illness. Mr. Tyter was born in East Westmoreland, N. H., in 1864, and began his railroad career as a brakeman on the Fitchburg (Boston & Maine) when he was fifteen years old. He was successively fireman and conductor and in 1888 was made yardmaster at Worcester. In 1895 he became yardmaster at Boston and in 1896 assistant superintendent of the terminal division. He became assistant superintendent of the Fitchburg division in 1897 and in 1912 was made superintendent of this division. In 1913 he became general superintendent of the Boston & Maine, which position he held at the time of his retirement in 1919.

JUN 29 1925

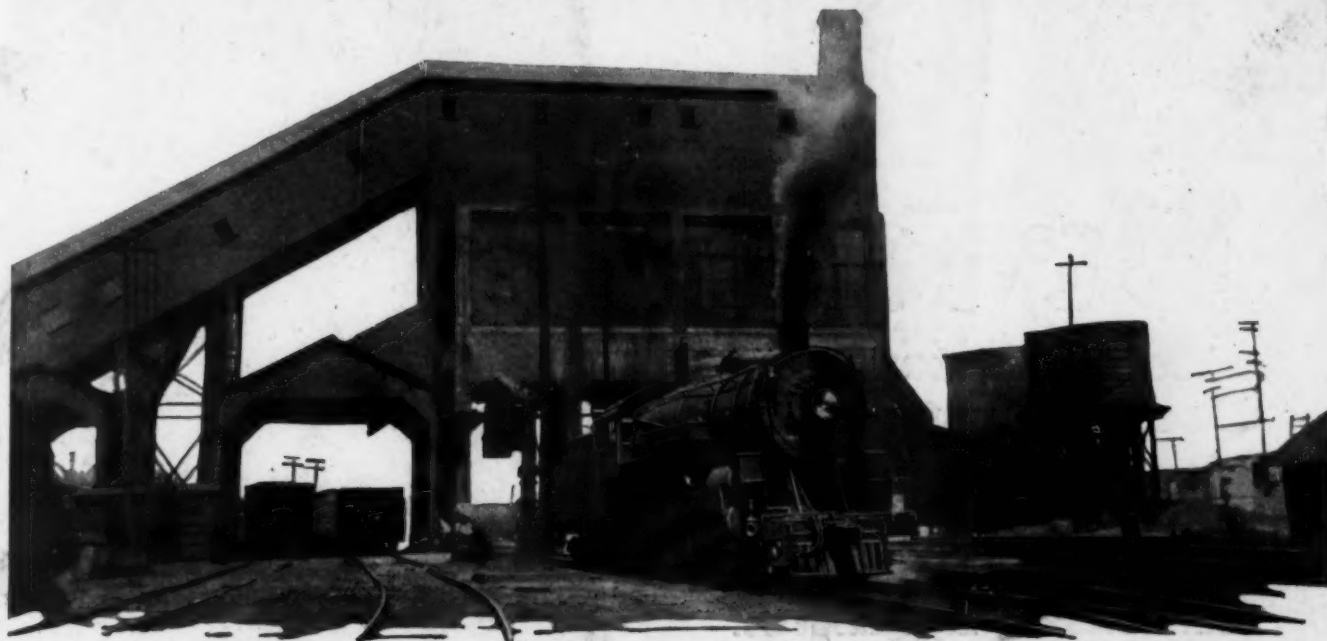
Railway Age

FIRST HALF OF 1925. No. 30

NEW YORK—JUNE 27, 1925—CHICAGO

SEVENTIETH YEAR

Published Weekly by Simmons-Boardman Pub. Co., 30 Church St., New York, N. Y. Subscription Price U. S., Canada and Mexico, \$6.00; foreign countries (not including daily editions), \$8.00; or £1.15.0. through London office; single copies, 25c. or 9d. Entered at New York, N. Y., as second-class matter.



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SECURITY Sectional Arch is a fuel saver, but it is something more.

It is a reducer of boiler maintenance by the protection it affords flues.

It is the equivalent of a bigger boiler, since it gives more steam from the same boiler.

It means more power from the same coal consumption; more tonnage hauled for the same firing labor; more transportation per dollar of operating expense.

Over 50,000 locomotives now enjoy these advantages from the Security Sectional Arch.



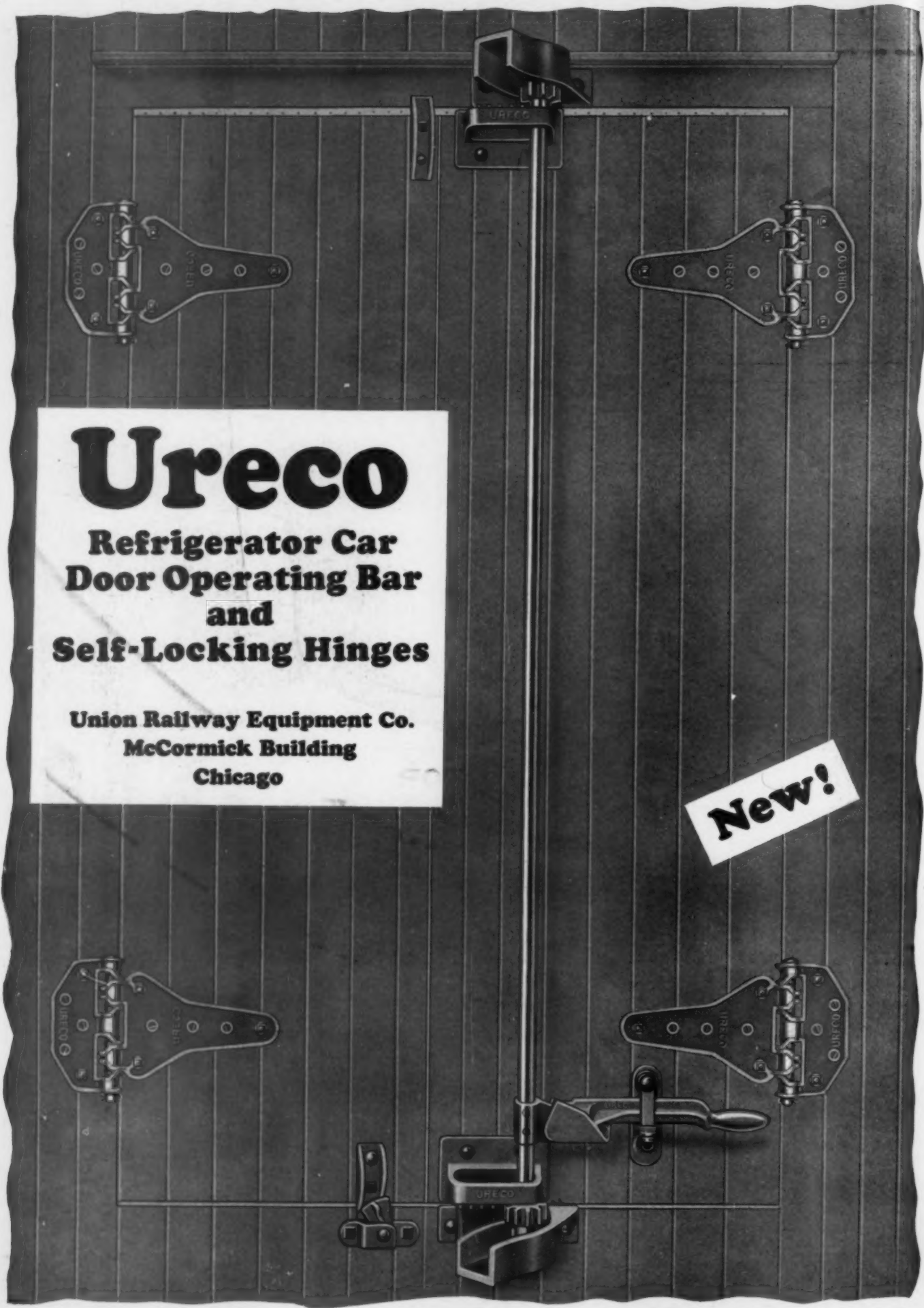
Ask for a copy of the
bulletin that tells how
Arches help.

AMERICAN ARCH COMPANY, Inc.

New York

Chicago

Security Sectional Arch



The background of the advertisement is a large, dark illustration of a refrigerator car door. The door is shown with its vertical staves and horizontal cross-staves. Four large Ureco hinges are mounted on the door, two on the left and two on the right. A central operating bar runs vertically down the middle of the door. At the top and bottom of this bar are locking mechanisms. The hinges and operating bars are shown in a detailed, technical style.

Ureco

**Refrigerator Car
Door Operating Bar
and
Self-Locking Hinges**

**Union Railway Equipment Co.
McCormick Building
Chicago**

New!

MINER

IDEAL SAFETY HAND BRAKES



**FOR
PASSENGER
EQUIPMENT**



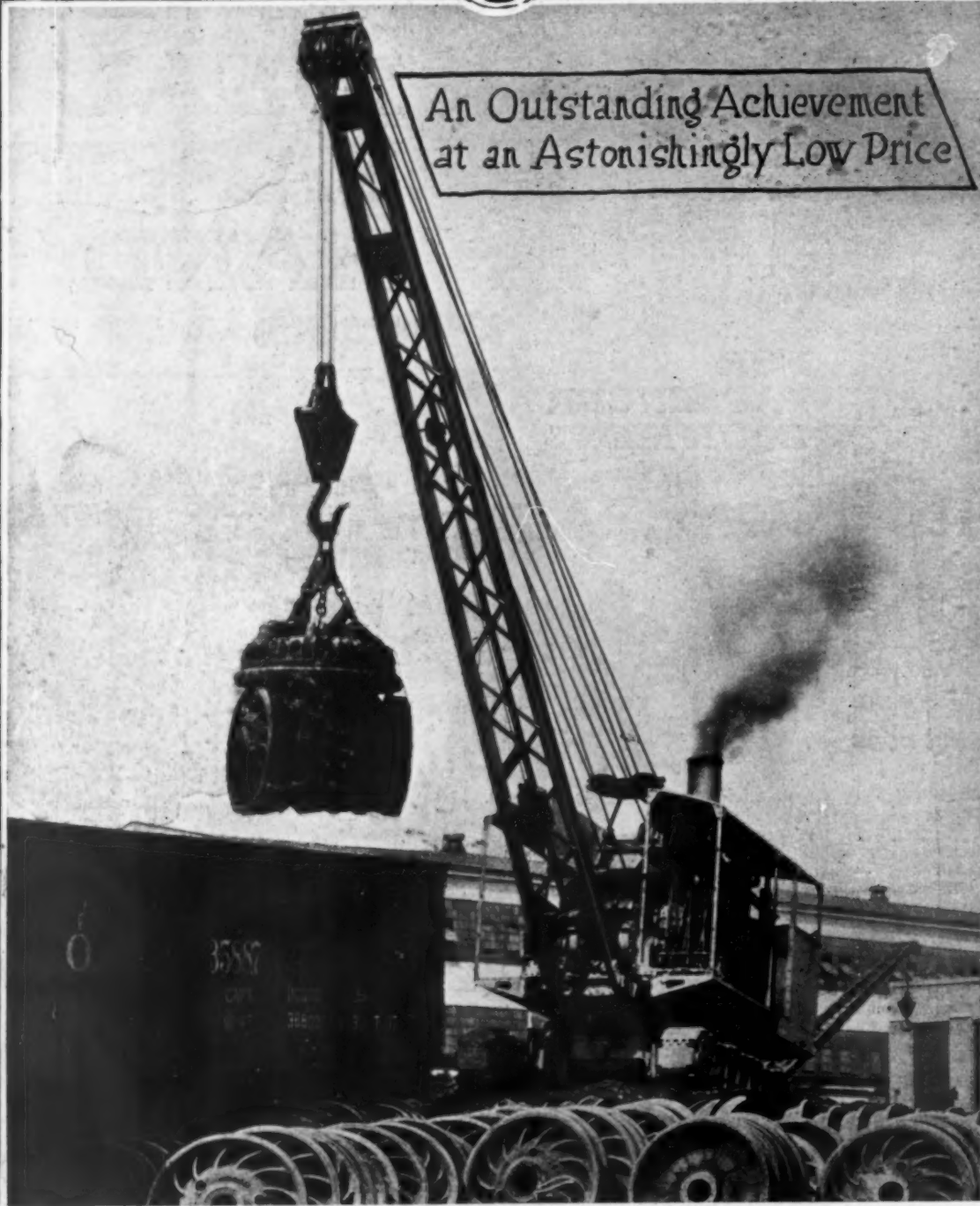
**FOR
FREIGHT
EQUIPMENT**

These efficient brakes are absolutely reliable. They operate safely and with ease, develop high power and protect trainmen, equipment and lading.

**W. H. MINER, INC.
CHICAGO**



An Outstanding Achievement
at an Astonishingly Low Price



INDUSTRIAL

CRAWLING TRACTOR CRANES

INDUSTRIAL WORKS • • • BAY CITY • MICHIGAN

Railway Age

Vol. 78

June 27, 1925

No. 30



An Open-Air Observation Car With Roof on the C. M. & St. P.

Contents

Missouri Pacific Tests Three-Cylinder LocomotivePage 1623

Recently-built Mikado of 65,700 lb. tractive force and weight of 244,500 lb. on drivers is given test on P. R. R.'s Altoona plant.

Attractive Architectural Treatment Used on New Office Units..... 1632

Modern buildings of Florida East Coast at St. Augustine harmonize architecturally and facilities can be increased with ease.

Western Roads Ask Livestock Rate Increases 1648

Twenty per cent rise requested in brief which sets out reasons for request.

EDITORIALS

Hot Boxes and Train Delays	1619
Crow's Nest Agreement Discarded	1619
Foremanship Training	1619
Railway Passenger Travel I	1620
Enginemen 100 Per Cent Efficient Physically	1621
Electric Locomotive Efficiency	1622

NEW BOOKS 1622

GENERAL ARTICLES

Missouri Pacific Tests Three-Cylinder Locomotive.....	1623
Conference Circuits Feature of Railroad Exchange.....	1628
Great Northern Stores Officers Discuss Their Problems.....	1629
Hearings on Proposed New York-Pittsburgh Line	1631

GENERAL ARTICLES—Continued

Preliminary Report on C. I. & L. Train Control.....	1631
Attractive Architectural Treatment Used on New Office Units..	1632
New Canadian Rate Law	1635
I. C. C. Hears Arguments on Van Sweringen Testimony.....	1636
Claim Agents Hold Annual Meeting.....	1637
Freight Car Loading	1640
Hughitt and Finley Retire	1641
Superintendents' Meeting Concluded	1643
Western Roads Ask Livestock Rate Increases.....	1648
Building a Twelve-Story Concrete Structure in Zero Weather..	1651
Checking Efficiency of Stores Operation	1652
How Large Systems Are Formed.....	1653

GENERAL NEWS DEPARTMENT..... 1657

Published every Saturday and daily eight times in June by the

Simmons-Boardman Publishing Company, 30 Church Street, New York

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The Railway Age is a member of the Associated Business Papers (A. P. B.) and of the Audit Bureau of Circulations (A. B. C.)

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

Subscriptions including 52 regular weekly issues and special daily editions published from time to time in New York or in places other than New York, payable in advance and postage free: United States, Mexico and Canada, \$6.00. Foreign countries, not including daily editions, \$8.00. Foreign subscriptions may be paid through our London office in £ s. d. Single copies, 25 cents each.

Fatigue in Mechanical Design

A message to the Superintendent of Motive Power and to the Chief Mechanical Engineer.

RESearch in Fatigue of metals has been world-wide. Are you acquainted with the findings, typical of which is the recent report of the University of Illinois Engineering Experiment Station Bulletin No. 124. This investigation and report was sponsored by the National Research Council. It showed:

Of all metals tested ARMCO Ingot Iron had the Highest Ratio of Endurance Limit to Yield Point

This unique property of ARMCO Ingot Iron can be exploited to your great advantage by specifying it as the material from which to forge such members as equalizer bars, spring hangers, drawbars, staybolts, and underframes of mine cars, etc. Write our Research Department for further information.

"Mechanical Department Uses for ARMCO Ingot Iron" is a new booklet containing valuable service data on economies through the use of this purer iron for equalizer bars; staybolts, gondolas, hoppers, car sides, refrigerators, etc.

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The Purest Iron Made
"Make Comparative Analysis"

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MIDDLETOWN, OHIO

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POSITION

(Railway Age, June 27)

**THE AMERICAN ROLLING
MILL CO., MIDDLETOWN, O.**



Export

The ARMCO International Corporation. Cable Address ARMCO, Middletown.



“Bad Order” Is Bad Business

“Bad Order” cars were officially declared “bad business” by the Association of Railway Executives last fall.

Every effort has been made to reduce their number. But how about their prevention?

Consider the multiple wear wheel that automatically cuts thousands of cars out of service and puts wheels in the shops for turning.

Here is an equipment waste that the “One-Wear” Wheel can stop. With Davis “One-Wear” Steel Wheels no shopping period is required to develop full wheel life—a life as long as the multiple wear wheel with all its turnings.

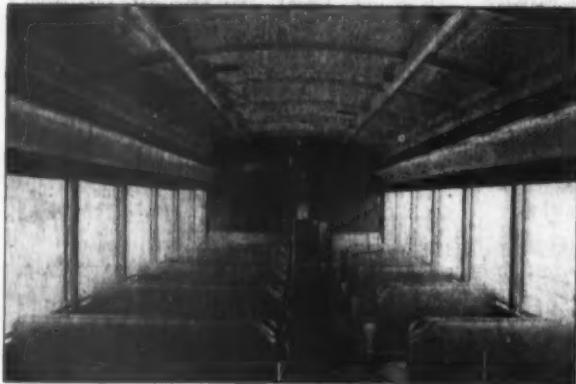
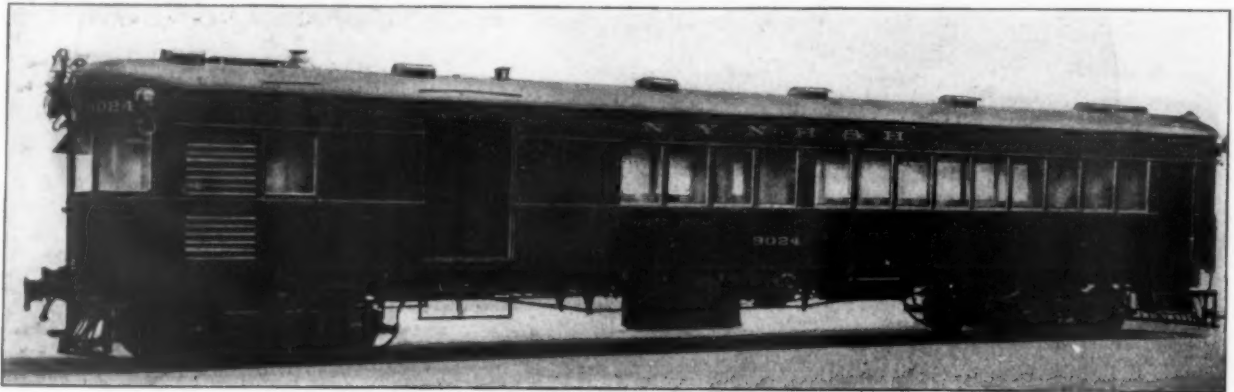
AMERICAN STEEL FOUNDRIES

NEW YORK

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Brill Gas-Electric Cars



For the New Haven

Double-end Control

In addition to the various types of Brill Gasoline Cars having mechanical transmissions, another success has been achieved by the introduction of the Brill Gas-Electric car recently delivered to the New York, New Haven & Hartford Railroad.

The car is equipped with

a six cylinder engine capable of 180 Hp. at 1200 R. P. M. direct connected to a separately excited 110 kw. direct current generators. It is driven by two 105 Hp. railway motors, one mounted on each truck, and controlled by an engine throttle and drum type controller.

AUTOMOTIVE CAR DIVISION

The J. G. Brill Company

Philadelphia, U. S. A.

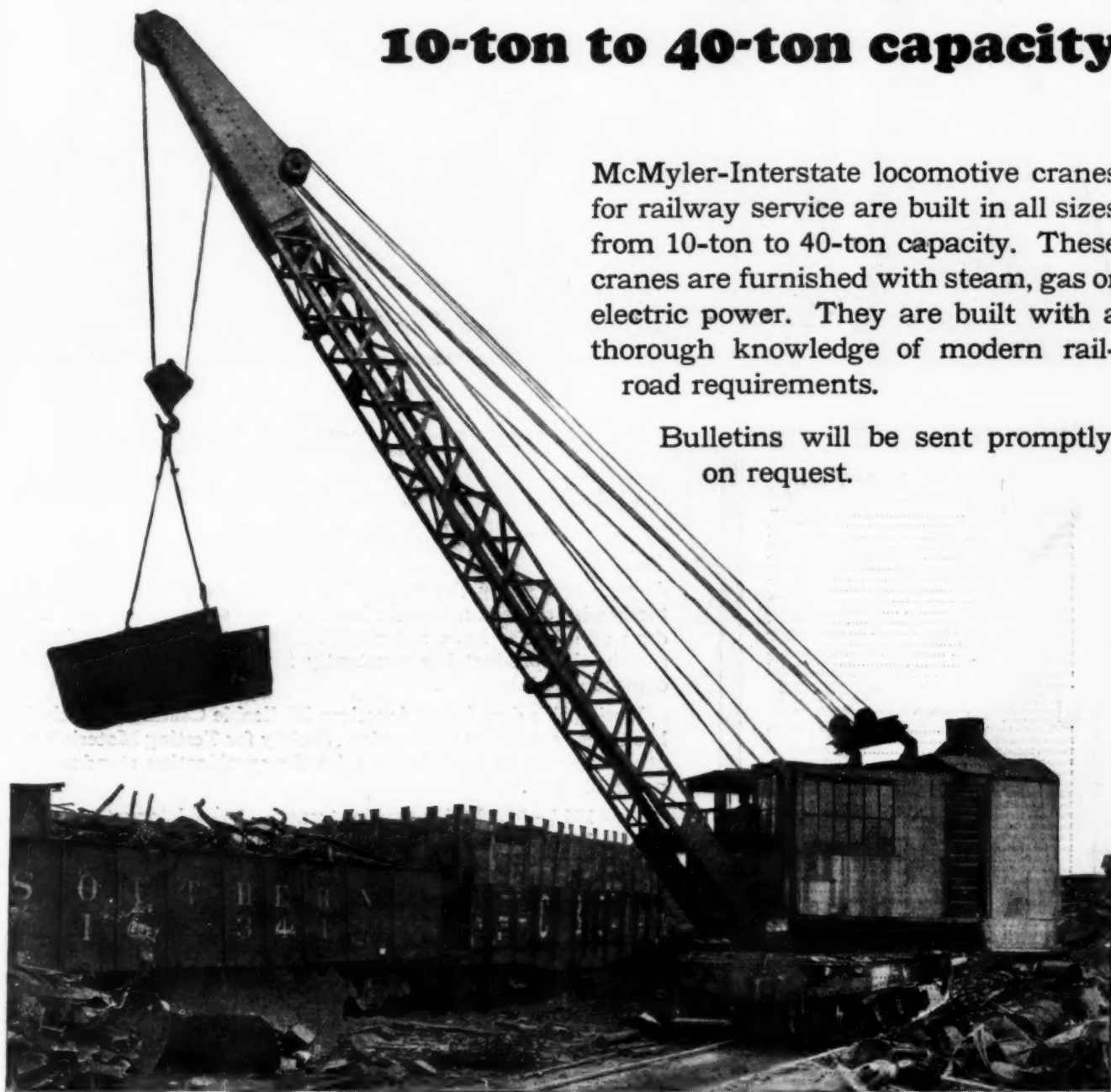


McMyler-Interstate Locomotive Cranes

10-ton to 40-ton capacity

McMyler-Interstate locomotive cranes for railway service are built in all sizes from 10-ton to 40-ton capacity. These cranes are furnished with steam, gas or electric power. They are built with a thorough knowledge of modern railroad requirements.

Bulletins will be sent promptly on request.



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Steam Shovels • Gas Shovels • Locomotive Cranes • Clam-shell Buckets

McMyler-Interstate

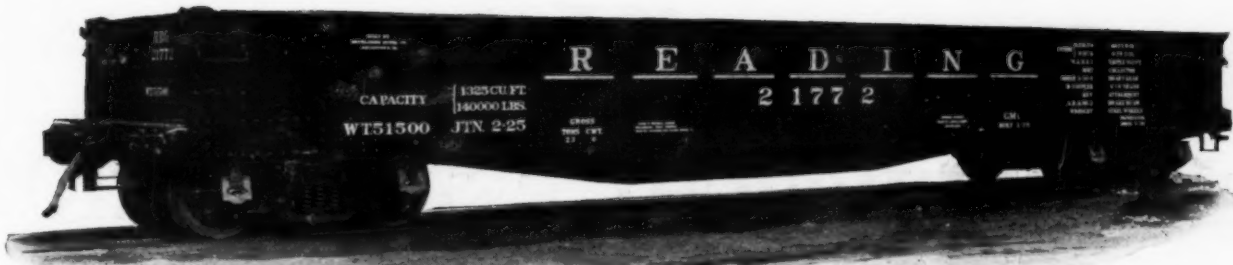
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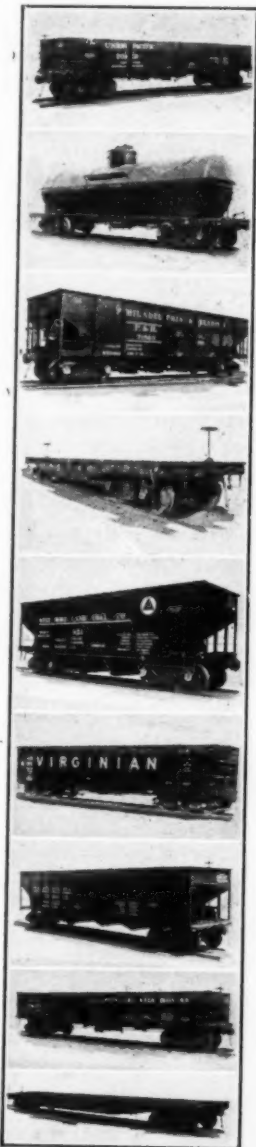
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Cambria Steel Freight Cars For Every Service



CAMBRIA Steel Freight Cars are built at the Cambria Plant of Bethlehem Steel Company at Johnstown, Pa., where the manufacture of freight cars has been carried on for over twenty years.

Cambria steel freight cars are built in all standard types including GONDOLA, BALLAST, FLAT, HOPPER, COKE, BOX AND TANK CARS to all standard specifications.

We are also prepared to manufacture any type of car embodying any special requirements for the economical handling of materials, and are in position to furnish such parts as underframes, trucks, wheels and axles, and forged, pressed and fabricated miscellaneous car parts.

The facilities of our large shops are ample for the production of large quantities of this kind of work. Experience gained in twenty years of car manufacture backed by the extensive steel-producing facilities of the company, is assurance of the proper working of the correct grade of steel for each particular job.

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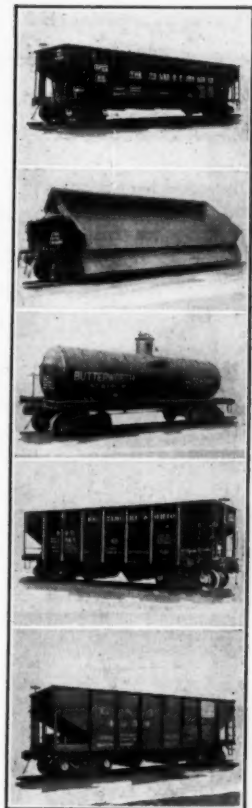
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Sole Exporter of our Commercial Products

BETHLEHEM



BETHLEHEM PLANTS

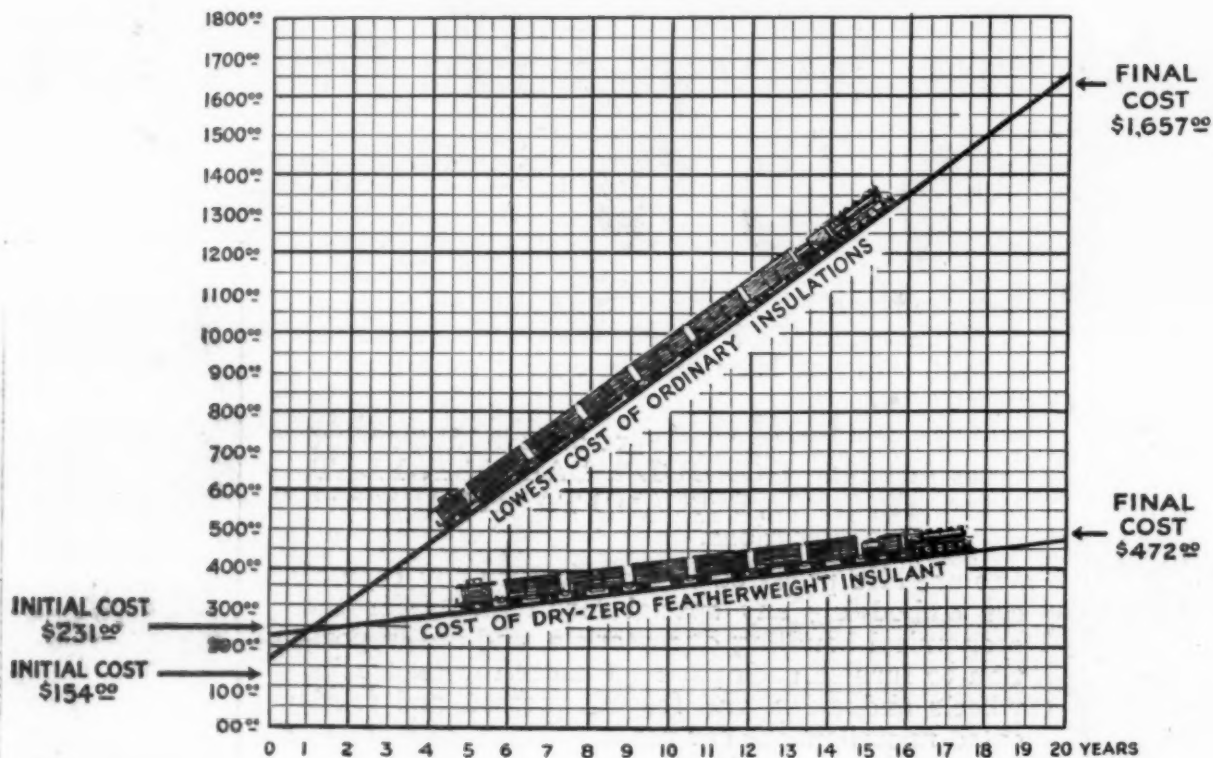
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DRY-ZERO

PAT. IN U. S. AND FOREIGN COUNTRIES

FEATHERWEIGHT REFRIGERATOR CAR INSULANT



*This light weight refrigerator car insulant
will save over \$1,000 in haulage costs alone*

DRY-ZERO weighs only 500 pounds per car as against 2,500 pounds of ordinary insulation. The figures on the chart above are based on the cost of hauling this extra ton of insulation. Figuring haulage costs at .003 per ton mile and 18,000 miles per year as the average run of a refrigerator car the amount saved during the life of a Dry-Zero car will be over \$1,000 in haulage costs alone.

But Dry-Zero enables you to economize in other respects. It cuts icings to the minimum. It maintains a more even temperature in the car and reduces spoilage claims.

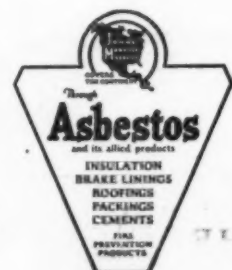
Dry-Zero will not pack down, and retains its thermal efficiency during the life of the car. Its hollow fibres are sealed at both ends, it is, therefore, moisture repellent.

Write for a sample and more complete details.

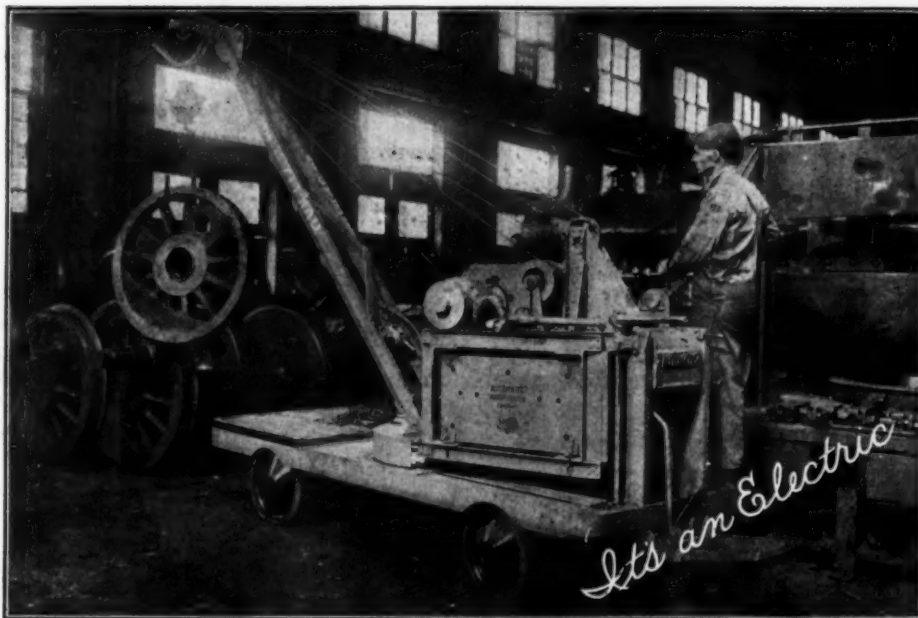
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MANY railway men have learned that the cost of operating electric industrial trucks and tractors is practically controlled by the total cost of their storage batteries. They can tell you that their tests of the Exide-Ironclad Battery established new standards of judgment, not only for battery performance but for battery cost. They made the test by putting an Exide-Ironclad Battery in an electric material-handling truck and checking every cost—to buy, to operate, and to maintain.

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Near you is one of our representatives, a qualified man on battery equipment for electric industrial trucks and tractors. When you get in touch with him, you can get detailed information that has enabled many railroads to clip dollars from handling costs they had considered low.

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They Telegraphed Galena

A TELEGRAM comes from a road using competing oils to "ship a drum of Galena Brake Cylinder Lubricant by express."

Galena is relied upon to remedy a deficiency in cheaper lubricants that has grown intolerable.

But why wait until train operation is threatened to discover what experience has established time and again.

That is, that railroad lubrication


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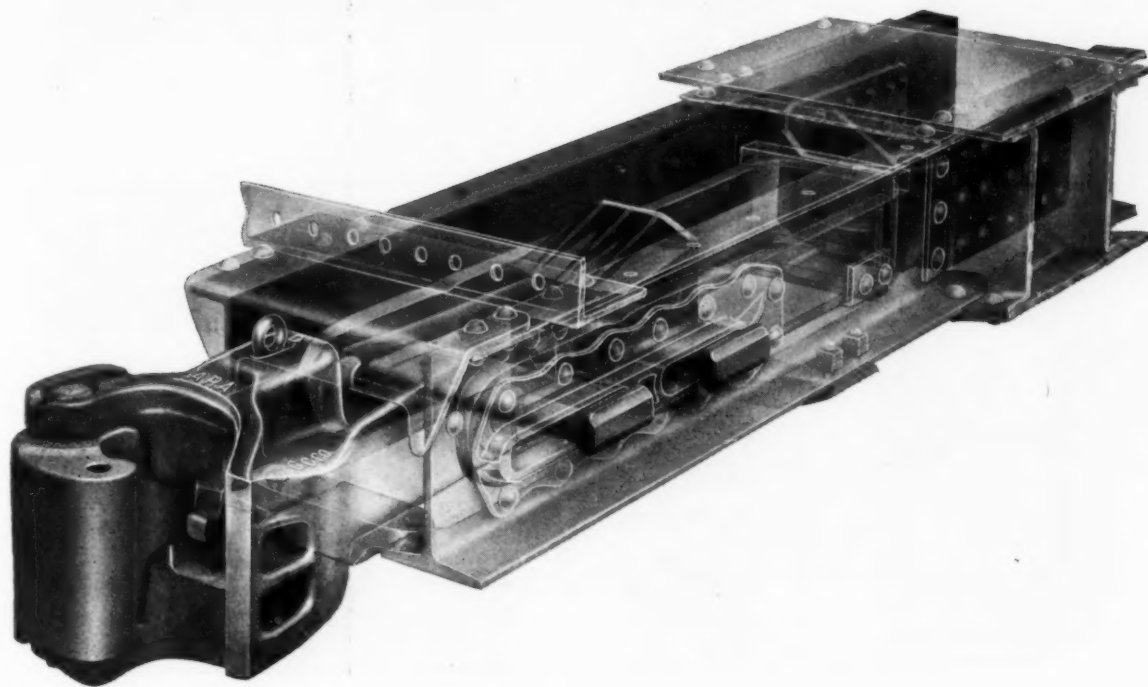


for transportation service



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DRAFT ATTACHMENTS



In Hump Yard Service

A LOADED 70 ton car is a 95 ton mass. When shunted against a lighter car built ten or more years ago, what happens?

Farlow Draft Attachments make the lighter car of years ago capable for the heavier service of modern rail-roading.

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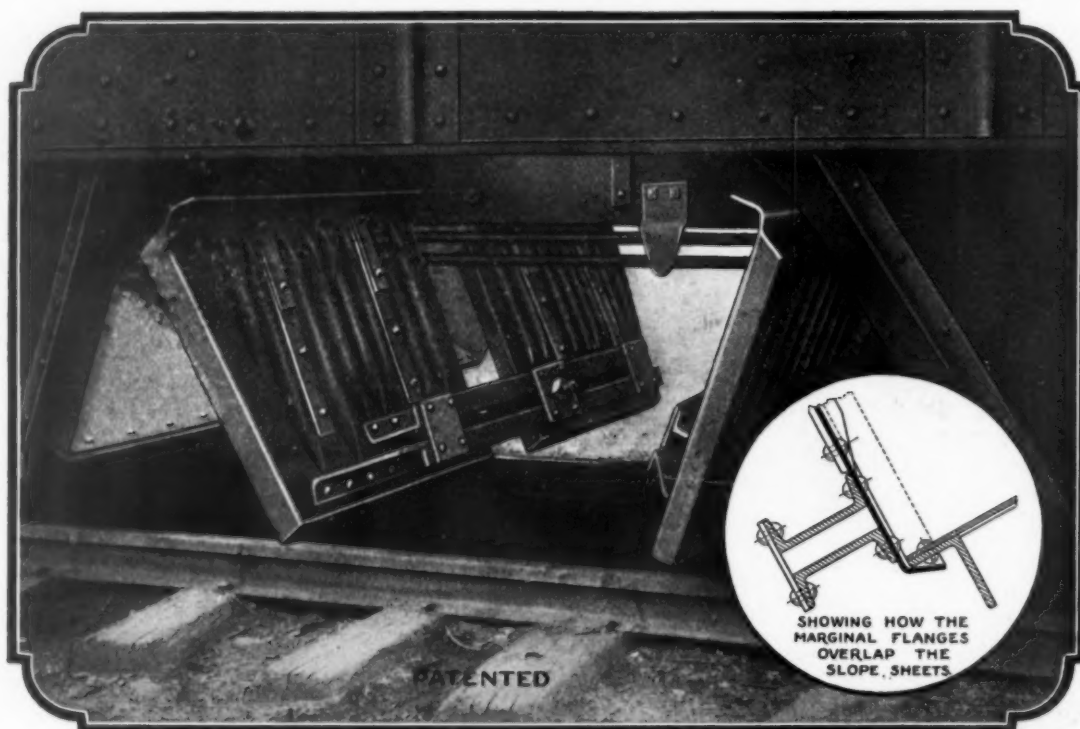
Boston

Montreal

WORKS: ROCHESTER, N. Y.

AJAX

CORRUGATED DOORS FOR HOPPER AND GONDOLA CARS



AJAX CORRUGATED HOPPER DOORS, reinforced by corrugations and marginal flanges, stand up under severe usage, absorb sharp concentrated blows, retain their shape and permit the operating mechanism to close the doors properly. Keep the car in service longer and reduce maintenance costs.

The side and bottom marginal flanges overlap the edges of the slope sheets, and even though the doors are not tightly closed, prevent loss of granular lading.

The marginal flanges are slightly flared out so as to make the doors easy to close and to prevent the accumulation of acid forming deposits, and the corrugations are turned up and run in the direction of the load in dumping so that there are no pockets to collect moisture.

THE INCREASED STIFFNESS OF CORRUGATED DOORS will hold them in shape long after corrosion has weakened flat plate doors to the point where they will give way.

Union Metal Products Company

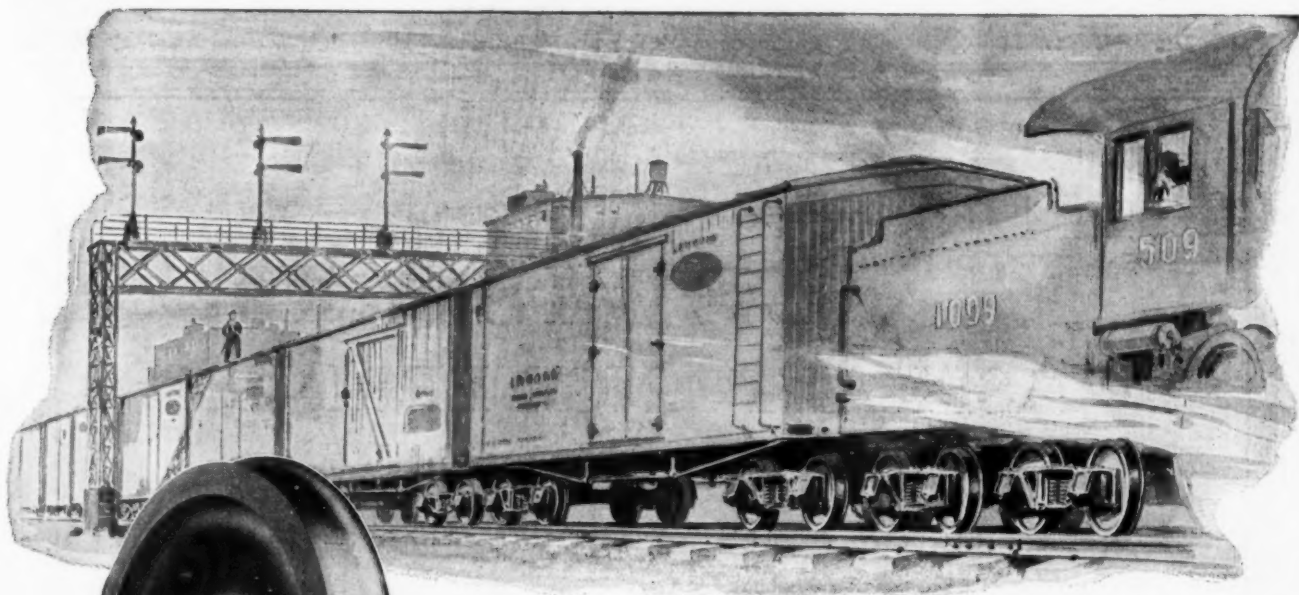
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Washington
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ST. LOUIS

Kansas City
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Denver
San Francisco

310 So. Michigan Ave.
CHICAGO



Strenuous Service *Demands* ~ Durable Equipment

The chart at the left tells the story.

More cars per train, more passengers and freight per car, more miles per passenger journey and greater haul per ton of freight—all serve to demonstrate the tremendously increased burden to which railroad equipment has been subjected in the last ten years.

Strenuous service demands durable equipment. That explains the increasing use of Gary Steel Wheels, both in passenger car and in freight car service.

Gary Wheels are *wrought steel* construction; they are made to exacting specifications in a wheel plant specially designed for their production and each wheel is fully tested at all stages of manufacture.

Gary Wheels may be depended upon to give that long life and small maintenance which bring about the condition in which every management is particularly interested: *low cost per mile of wheel service.*

TRAFFIC BAROMETERS	Fiscal Year 1914	Cal- endar Year 1924	Per Cent Increase July 1, 1914, to Jan- 1, 1924.			
			10	20	30	40
Passenger Cars Per Train.....	5.62	6.50				
Passengers Per Train.....	58.42	69.03				
Journey Per Pas- senger (miles)	33.25	38.46				
Freight Cars Per Train.....	33.26	38.96				
Revenue Tons Per Train.....	474.83	644.62				
Haul per Ton of Frt. (miles)...	144.17	178.86				
Tractive Power of Locomotives (Lbs.).....	31,006	38,835				

Traffic Growth During the
Last Decade

Illinois Steel Company

General Offices, 208 S. La Salle St.

Chicago, Illinois

District Offices Located in All Principal Cities



LEWIS ASPHALT ENGINEERING CORPORATION

Successors to GARDINER and LEWIS, INC.

ENGINEERS and MANUFACTURERS

Specializing in

Protection against Water and Corrosion

ASPHALT



PRODUCTS

For Hot Application

"Karnak" Membrane Waterproofing	"Karnak" Expansion Joint Filler
"Karnak" Waterproofing Fabric	"Karnak" Roofing Material
"Karnak" Waterproofing Asphalt	"Karnak" Special Purpose Asphalts

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"Krodeproof" Emulsified Asphalt for Brush or Spray Application	"Korkseal" Emulsified Asphalt Plaster for Trowel Application
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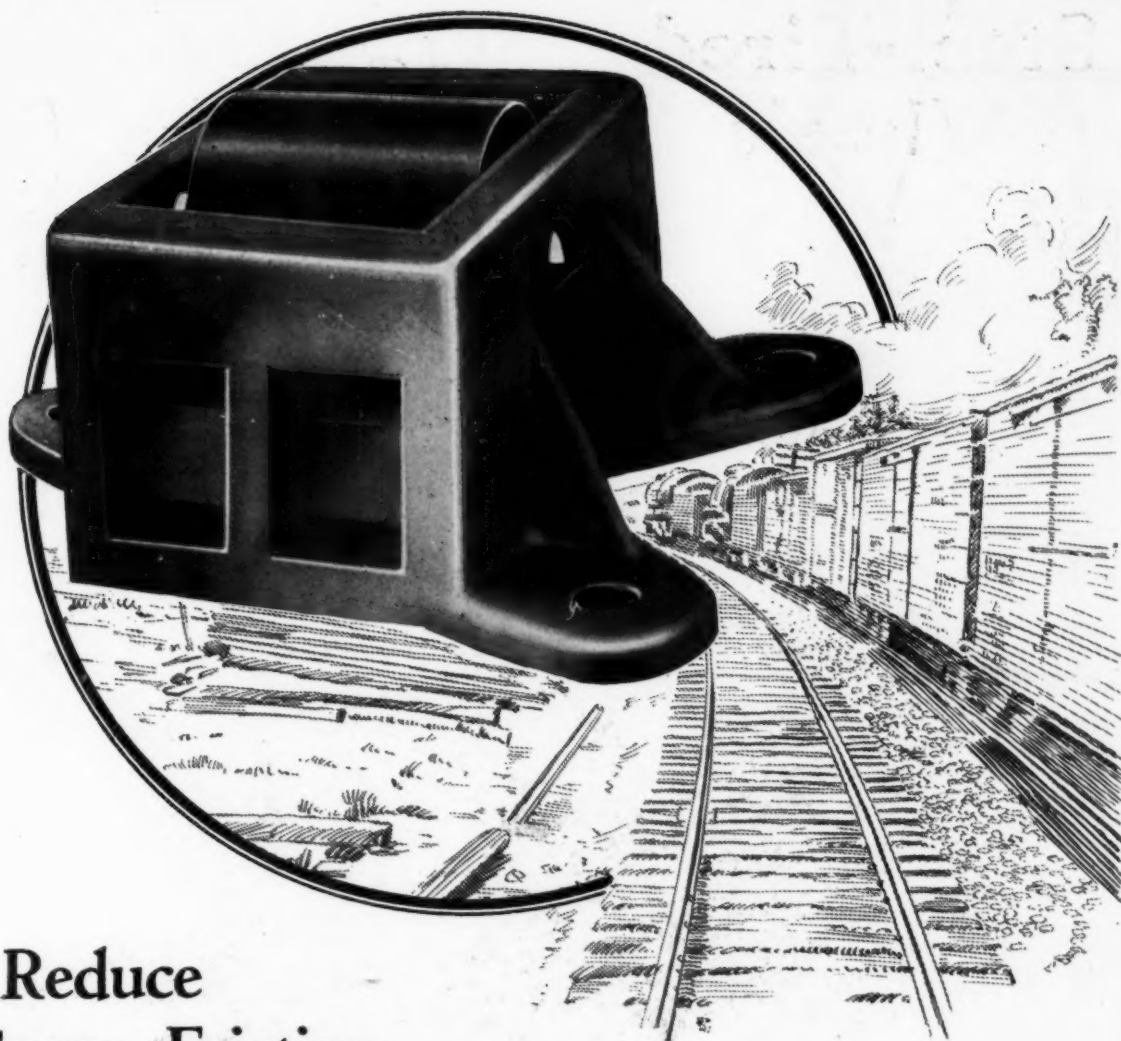
"Karnak" Liquid Damp-proofing	"Karnak" Stone Backing
"Karnak" Trowel Plastic	"Karnak" Structural Steel Paint
"Karnak" Brush Plastic	"Karnak" Primers, etc.

Main Office

30 Church Street, New York City

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To Reduce Curve Friction

TO combat the frictional resistance imposed by curves your locomotives consume many extra thousand tons of fuel every year.

This same friction keeps many men busy on the cripple tracks changing wheels and wheel lathes busy retrueing worn flanges.

To decrease curve friction is the chief function of all side bearings—Wine Roller Side Bearings are known as Anti-Friction Side Bearings—Their duty is to *eliminate* curve friction.

Trucks equipped with Wine Side Bearings have unrestricted motion regardless how sharp the curves may be—They help your locomotives to haul more tonnage in less time over the road and increase the service life of your car wheels.

Specify Wine Side Bearings

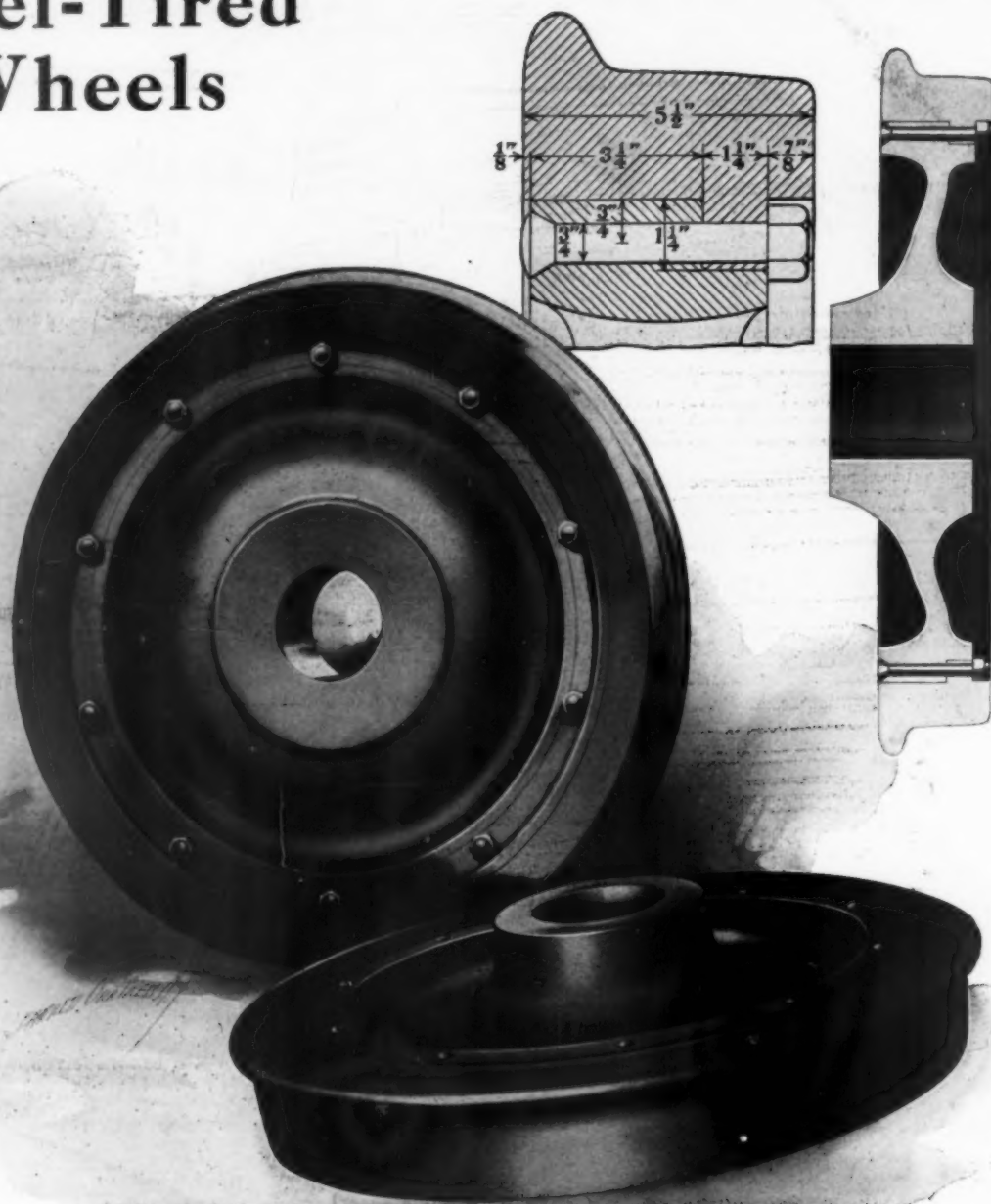
The Wine Railway Appliance Co.
TOLEDO, OHIO

Grand Central Terminal, New York

Peoples Gas Bldg., Chicago, Ill.

 **WINE** 
SIDE BEARINGS

Steel-Tired Wheels



THE superiority of "Railway" Steel-Tired Wheels has been effectively demonstrated by the excellent service obtained from this equipment on many of the leading railroads in this country and abroad.

They have been especially designed to meet the most exacting requirements of modern operating conditions, while their

manufacture embodies the highest grade workmanship and materials. We are prepared to furnish various types of steel tired wheels with cast iron, cast steel or forged and rolled steel centers fitted with either Latrobe or Inter-Ocean Tires. The centers and tires are turned and bored to standard gauges and are interchangeable.



Railway Steel-Spring Company

30 CHURCH ST., NEW YORK

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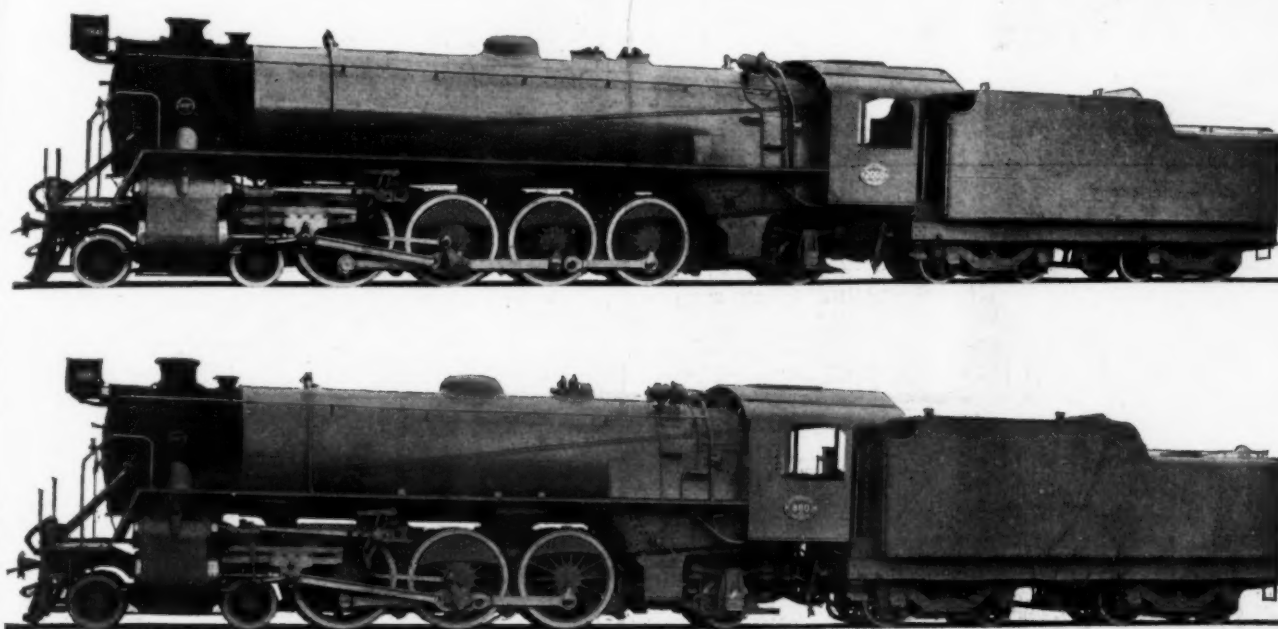
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Montreal, Que.



Narrow Gauge Locomotives for South African Rys.

The Baldwin locomotives pictured above are the largest narrow gauge locomotives ever built. Standard Steel Works' quality forgings, driving tires, wheels and springs are included in the specifications.



STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

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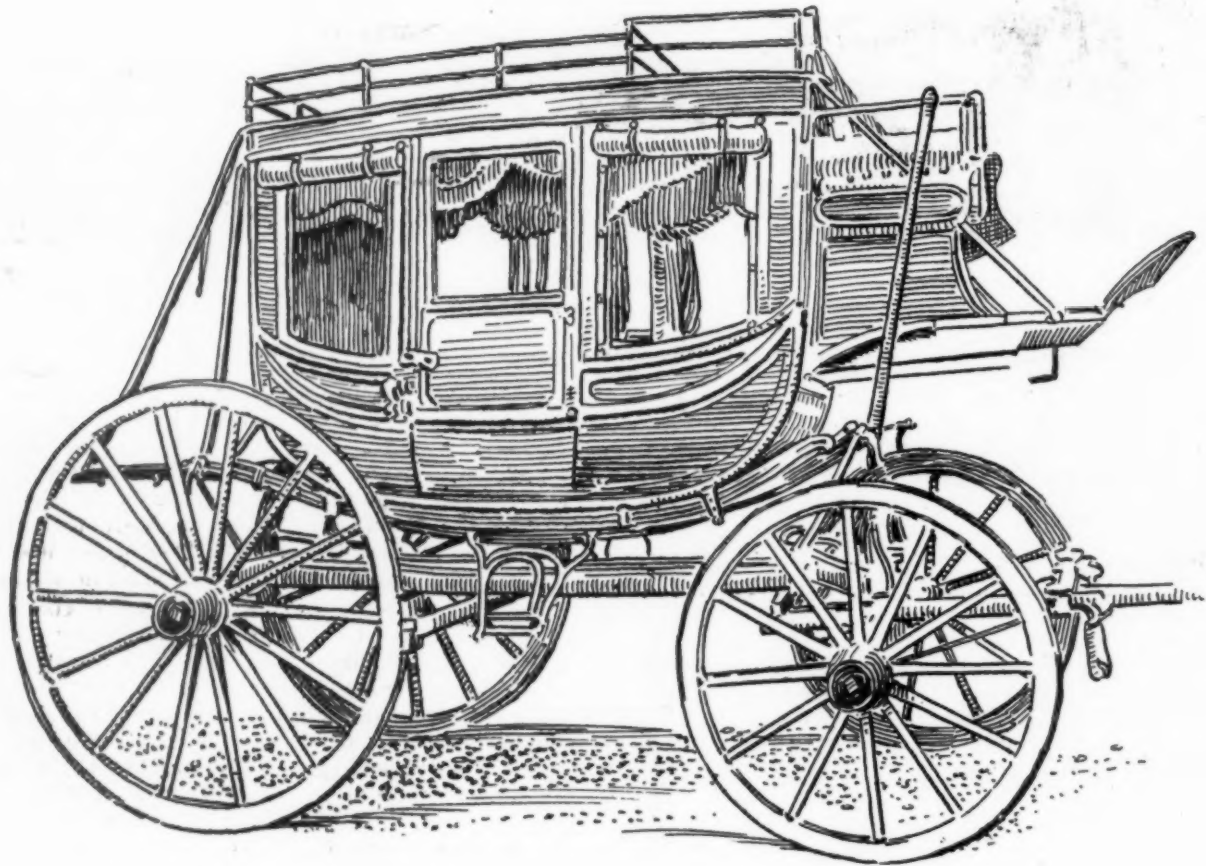
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On the Roof or Under It

In the days of the old Concord coach, passengers were protected from the weather by the roof, while package freight took its chances by being carried on the roof.

Some things we do better in these days.

A freight car provided with a

DRY LADING ALL-STEEL ROOF

affords as much protection to valuable freight as is afforded the passenger in a first-class coach.

It is permanent protection, too, because the roof does not rust.

HUTCHINS CAR ROOFING COMPANY
DETROIT MICHIGAN
Established 1890



Another Road

—showed a saving in fuel well over a million dollars in 1924 as compared with 1923.

But saving fuel is not as big a thing as conservation of fuel.

Effective use of fuel is the financially important accomplishment.

This means more tons moved faster for the same fuel.

Railroad officers who are taking advantage of this principle are making a lot of money out of it.

G. M. BASFORD COMPANY, NEW YORK CITY



7

EFFICIENCY OF THE BOOSTER

Demonstrated in March Tests Between Cut Bank and Havre

QUITE A BIT of interest was centered on a tonnage handling test made during the latter part of March on the "High Line" between Cut Bank and Havre, a distance of 129 miles.

The object was to make a comparative test between a Q-1 engine, the 2126, equipped with a booster, and other engines of the same type, not so equipped, under similar weather and traffic conditions.

TABULATION OF TESTS

Type and No. Eng.	Date	Loads	Tons	Time Consumed	Actual Running Time	Delays	Miles per Hr.	Booster Used
Q1, 2106 without booster ...	3/18	65	3000	10h. 30m.	7h. 10m.	3h. 20m.	12.3	.....
Q1, 2126 with booster.....	3/19	85	3810	10h. 56m.	6h. 44m.	4h. 12m.	11.7	1h. 9m.
Q1, 2106 without booster...	3/23	65	3000	7h. 20m.	6h.	1h. 20m.	17.6	.....
Q1, 2126 with booster.....	3/22*	88	4025	6h. 42m.	5h. 25m.	1h. 17m.	19.4	51½m.
Q1, 2102 without booster..	3/25	73	3300	12h. 20m.	7h. 50m.	4h. 30m.	10.5	.....
Q1, 2126 with booster.....	3/25**	84	3775	10h. 25m.	6h. 30m.	3h. 46m.	12.3	1h. 26m.

SUMMARY

Q1, 2126 with booster.....	Average	85	3870	9h. 21m.	6h. 16m.	3h. 5m.	13.8	1h. 12m.
Other engines.....	Average	68	3100	10h. 3m.	7h.	3h. 3m.	12.9	.....

GAIN OF ENGINE EQUIPPED WITH BOOSTER

Average running time decreased 44 minutes.

Average speed per hour increased .9 of a mile.

*On Sunday, with light opposing traffic.

**Adverse weather and rail conditions.

Information furnished through the courtesy of H. G. Ames, Associate Editor Montana Division.

Reprinted from The Great Northern Semaphore

Franklin Railway Supply Co. Inc.
New York Chicago

LIMA 2-8-4 Two Cylinder



Super-Power Steam Locomotive

An Outside dry pipe
and shut off valve at the dome

are features of the Lima 2-8-4 Super-Power Steam Locomotive



By placing the dry pipe in this position a 5 per cent increase
in steam space within the boiler is provided.

Increased availability for service results from—

Dome shut off valve permitting work on live steam and
superheater connections without blowing down boiler.

Dry pipe joints outside of boiler where they are accessible.





Reducing "New Tubes Per Locomotive Per Year" From Thirty to Eight

ON a certain large road, the Superintendent of Motive Power conducted a test on over 500 locomotives, comparing the service life of Charcoal Iron Tubes and tubes of lower-priced but less-resistant material.

The results of this test are of interest to every railroad man who is responsible for the conduct of transportation:

—the locomotives which were NOT equipped with Charcoal Iron Tubes, but with the lower-priced and less-resistant tubes, averaged 30 new tubes per locomotive per year,

—while the locomotives equipped with Charcoal Iron Tubes needed only 8 new tubes per locomotive each year!

Of course, there are definite reasons for this longer service of Charcoal Iron Tubes. Every Charcoal Iron Parkesburg Tube is built up of five,

six or seven separate layers of iron. In each layer are minute particles of cinder and slag, which retard pitting and corrosion.

It is natural, therefore, that Charcoal Iron Parkesburg Tubes give longer service than other tubes which lack Parkesburgs' corrosion-resisting elements and multiple-ply fabrication.

How many new tubes per locomotive do you apply each year? A test will quickly prove how this mark can be lowered, using corrosion-resisting Charcoal Iron Parkesburg Tubes. Write or wire Parkesburg and arrange for a few test sets.

The Parkesburg Iron Co.

Parkesburg, Pa.

BRANCH OFFICES

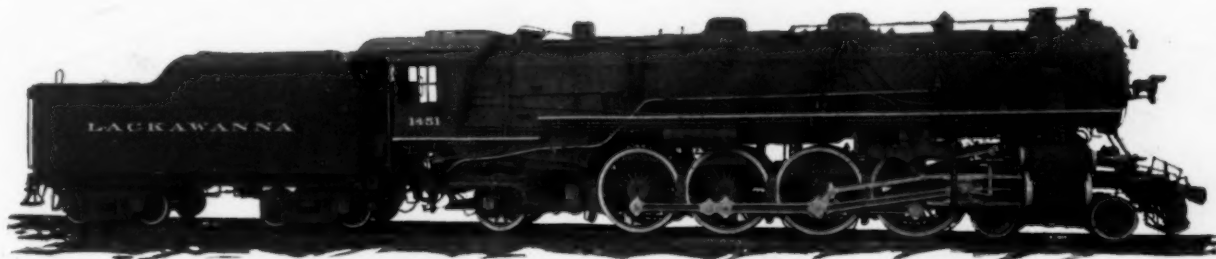
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PARKESBURG TUBES

SHOWING THE WAY



THREE CYLINDER MOUNTAIN TYPE LOCOMOTIVE BUILT FOR THE DELAWARE, LACKAWANNA & WESTERN RAILROAD

Weight on Driving Wheels, 256,000 pounds; Weight of Engine, 382,000 pounds; Three Cylinders, 25 x 28 inches; Diameter of Driving Wheels, 73 inches; Boiler Pressure, 200 Pounds; Maximum Tractive Power, 61,100 pounds.

Two of these locomotives were completed in our shops on April 1st and 2nd, 1925, and went into service April 5th, 1925.

Ten days after leaving our shops one of these locomotives was put on the "Lackawanna Limited," the hardest and fastest scheduled train on this road.

This locomotive was designed for passenger service between Scranton and Hoboken, where the road passes over the Pocono Mountains. There are 20 miles of continuous grade—1.69% maximum. The purpose was to avoid double heading. At no time since these engines were put in service have they been used with a helper.

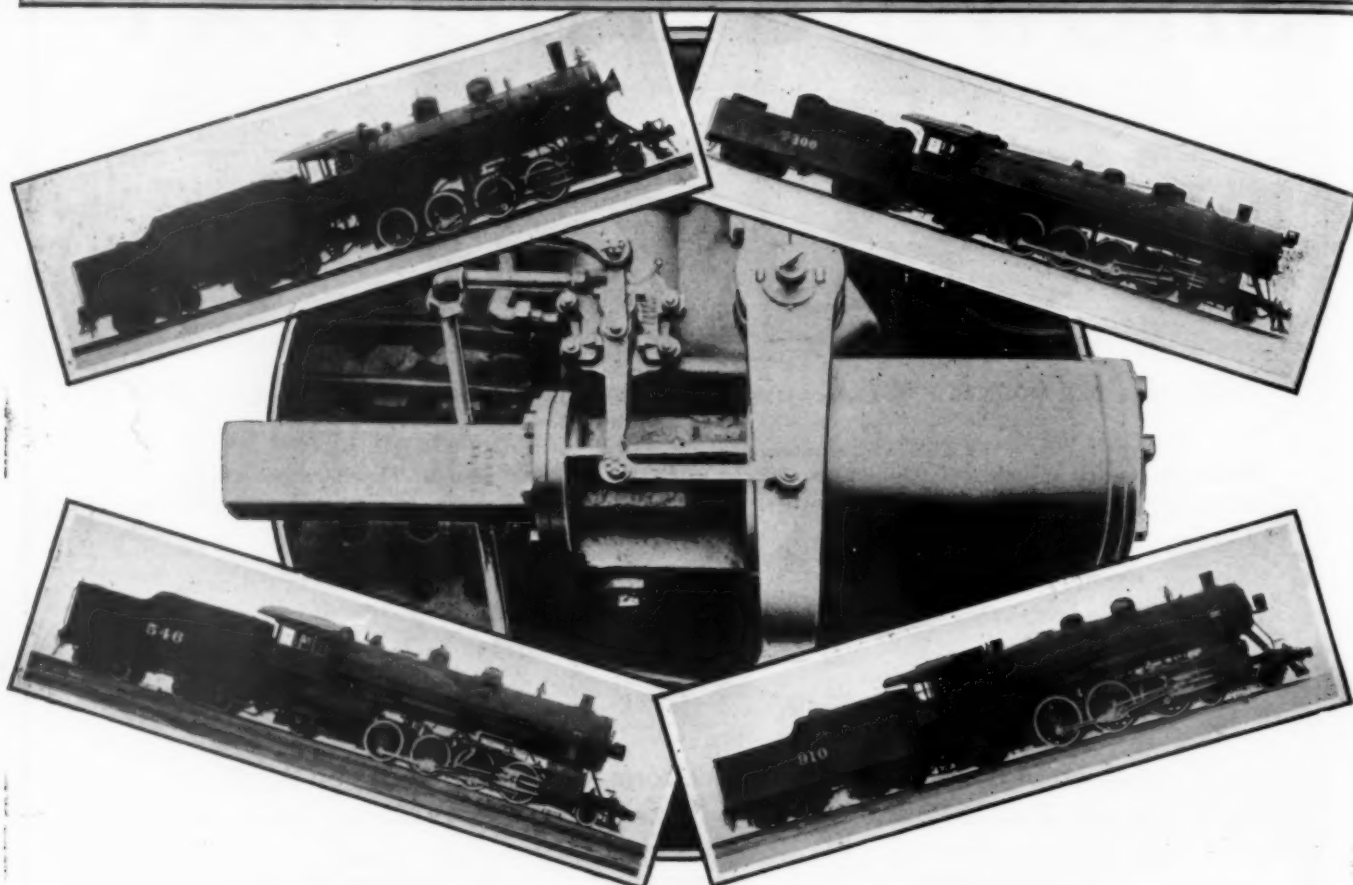
So successful have these locomotives proven that a second order for three more of the same type and size has been recently received.

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET

NEW YORK CITY

\$529,000,000 For Locomotive Fuel



STATISTICS show that during 1923, the latest year for which figures are available, Class I roads alone spent \$529,000,000 for fuel.

It is immediately apparent that if every locomotive not only for Class I roads but also on Class II and III carriers as well, were equipped with a reliable, non-creeping power reverse gear that could be depended on to maintain the correct steam distribution under all operating conditions—the savings that could be effected in this tremendous annual expenditure for fuel would be most impressive indeed.

You have it in your power to make such savings in fuel costs a reality on your particular railroad by equipping each of your locomotives with the Barco Power Reverse Gear—the gear that cannot creep and which unfailingly maintains the selected cut off at all times with a corresponding economy of fuel.

A self locking worm and gear mechanism holds the Barco gear constantly in correct position. Air leakage cannot change the point of cut off. *In case of air or steam failure the Barco Gear can be operated by hand.*

You merely advance the money paid for a Barco Power Reverse Gear. It returns its cost many times over in fuel saved and in reduced maintenance.

Barco Manufacturing Co.

1801 Winnemac Ave., Chicago, Ill.

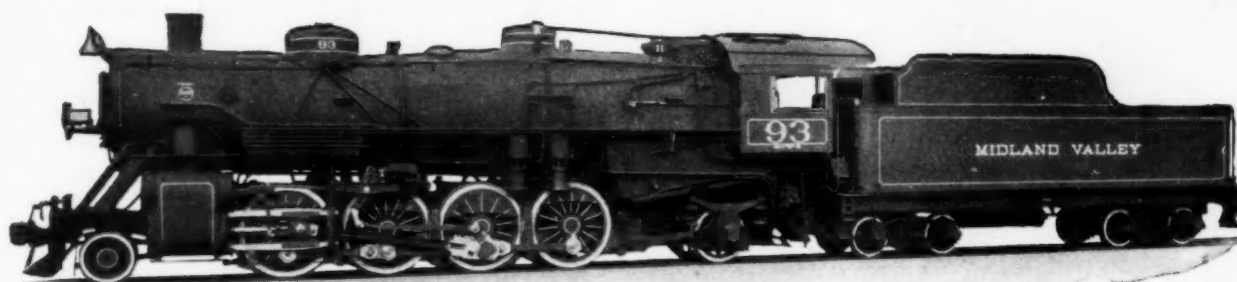
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Montreal-Toronto

THE HOLDEN CO., LTD.

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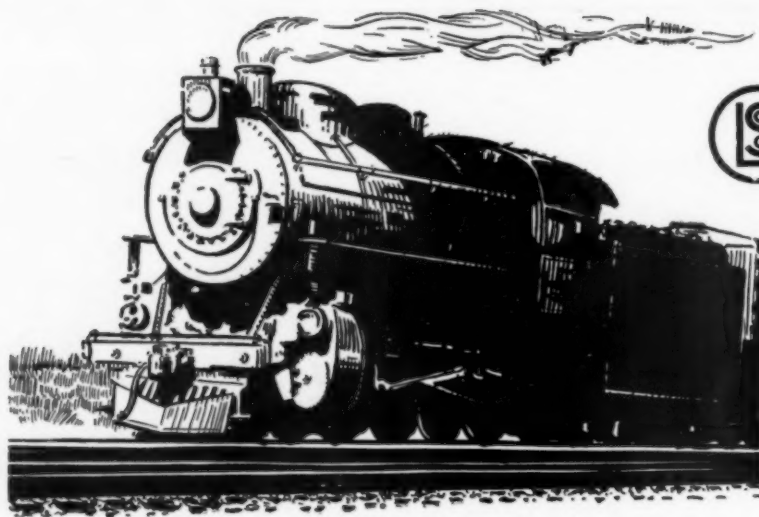
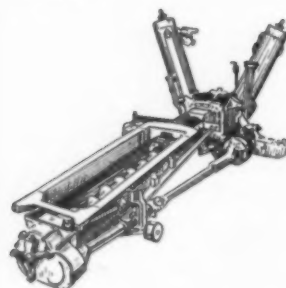
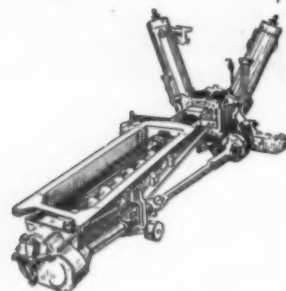
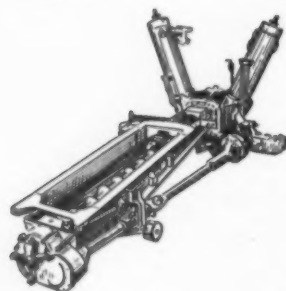
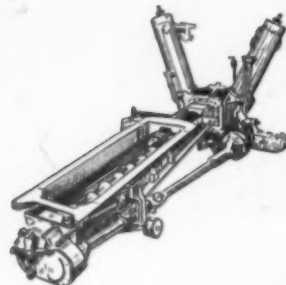
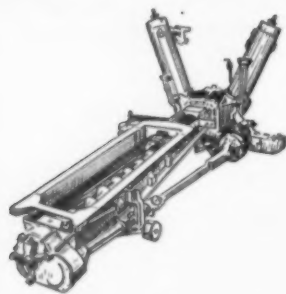
Barco Power Reverse Gear

THE BALDWIN LOCOMOTIVE WORKS



Construction No. 58,305

PHILADELPHIA
1831—1925



5 Duplex Stokers=1 Locomotive

If you need additional motive power because of increasing tonnage demands, and contemplate the purchase of more hand-fired locomotives, permit us to suggest that you can get the equivalent hauling power of one hand-fired locomotive by installing DUPLEX STOKERS on five of your engines now in service.

Many railroads find that much greater tonnage can be hauled since their locomotives have been mechanically-fired by Duplex Stokers, this increase often being 20%, or more, over what could be hauled with hand-fired locomotives.

Such a marked improvement is due to the unique system of fuel distribution which permits even the largest locomotive to be fired to full capacity with perfect ease.

7200 of our Stokers are in service on 80 railroads.

LOCOMOTIVE STOKER CO.

Main Office and Works—30 General Robinson St., West,
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Let us repair your Air Brake Apparatus, because—

3 Repair Plants



Westinghouse Air Brake Repair plants are located at three convenient points on the map: Wilmerding, Pa., St. Louis, Mo., and Emeryville, Cal. Your repair needs will be taken care of promptly at either of these points. Ship to the one nearest you.

We can do it more economically.

Our facilities are ample for quantity production which insures the work being done at minimum cost.

We can do it more efficiently.

Our repairmen are trained by long experience and have the best tools and equipment at their disposal, which assures skilled execution of the work.

We can do it more promptly.

Upon receipt of an order to repair certain parts, we take from stock the corresponding number of units, already overhauled and rebuilt, and ship them to the customer immediately to avoid delay in getting equipment back into service.

WESTINGHOUSE AIR BRAKE CO.



General Office and Works, Wilmerding, Pa.



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We have daily
production in all
kinds of Agathon
Alloy Steels such
as—

Nickel
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Deliveries in Blooms,
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Rolled, Heat Treated,
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Strips, etc.



AGATHON ALLOY STEELS

Longer Life for Locomotives

Agathon Alloy Steels are furnished in many analyses to meet various requirements in locomotive parts. Their anti-fatigue and shock-resisting qualities are over 50% greater than those of annealed carbon steel forgings. Main rods, side rods, piston rods, axles, crank pins or any other highly stressed and wearing parts will render 50% greater service if made of Agathon Alloy Steels. This means fewer costly delays, repairs and interruptions of train schedules. Agathon Alloy Steels add years to the productive life of locomotives.

Our staff of expert metallurgists, practical steel men and complete metallurgical laboratories, are at your service, without charge, to help you solve your problem in steel. Ask for a copy of our Agathon Alloy Steel handbook.

The Central Steel Company
MASSILLON, OHIO



FOR LOCOMOTIVE PARTS



Locomotive Mileage 72,000 Stoker Maintenance Thirty Dollars



In the DUPONT-SIMPLEX TYPE "B" STOKER, a single curved conduit replaces the entire coal elevating mechanism

LESS than one-half mill per locomotive mile is the total maintenance expense of the DUPONT SIMPLEX STOKER on the Mikado type locomotive shown above over a period of 72,000 miles.

This low maintenance emphasizes the dependability of performance and the simplicity of operation of the DUPONT SIMPLEX STOKER—both factors which mean more continuous locomotive service.

Standard Stoker Company, Inc.

350 Madison Avenue, New York, N. Y.

McCormick Bldg., Chicago, Ill. duPont Bldg., Wilmington, Del.
Foundries and Works, Erie, Pennsylvania

DUPONT-SIMPLEX TYPE "B" STOKER

Absolute dependability in boiler feed-water supply

DEPENDABILITY is the outstanding characteristic of the Worthington Double-suction Turbine Boiler Feed-pump. It has successfully met the need for positive, unfailing feed-water supply, and can be depended upon to render continuous service.

Among its outstanding features are:

1. Balancing chambers on each side of double-suction impellers connected by port through diffusion vane insure hydraulic balance.
2. Ample and correctly formed water passages insure equal delivery of water to both impeller inlets of each stage.
3. Floating wearing rings between impellers and casing and between stages, free to center themselves with rotating

parts, present ample wearing surfaces and reduce wear and leakage. Rings quickly renewed without machining or fitting.

4. Water-cooled multi-stage marine thrust bearing assures lateral alignment of impellers.

The Worthington Double-suction Turbine Boiler Feed-pump is built in sizes from four to ten inches for the more common boiler pressures and for standard electric motor and steam-turbine speeds.

Ask for Bulletin No. W-1073, which will enable you to convince yourself of the soundness of the features of the design and the construction of the Worthington Double-suction Turbine Pump.

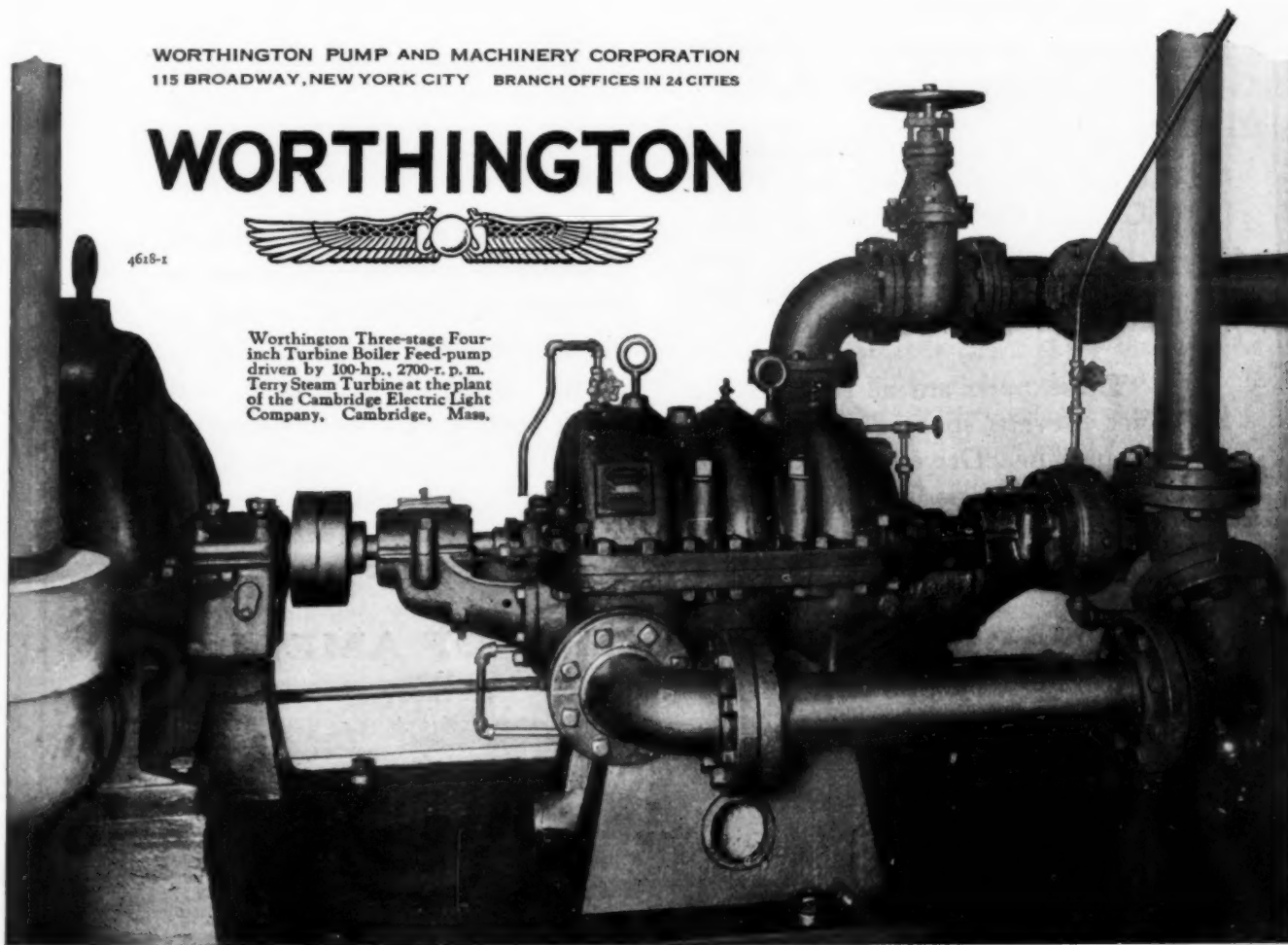
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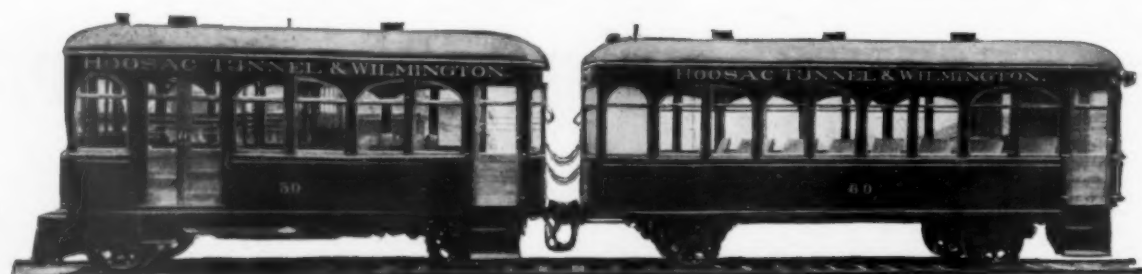
WORTHINGTON



4618-1

Worthington Three-stage Four-inch Turbine Boiler Feed-pump driven by 100-hp., 2700-r. p. m. Terry Steam Turbine at the plant of the Cambridge Electric Light Company, Cambridge, Mass.





Contributing to the dependability, efficiency, and economy of this FWD Gasoline Train are its axle shafts, propellor shafts, clutch shafts, steering arms, axle truss rods and transmission driving dogs, all of Vanadium Steel.

FWD Chooses Vanadium Steel For Parts Subject To Severe Stress

THE Four Wheel Drive Auto Co., Clintonville, Wisconsin, builds its FWD Gasoline Cars for greatest dependability, efficiency and economy in operation.

Contributing to the attainment of these objectives are the FWD Gasoline Car's axle shafts, propellor shafts, clutch shafts, axle truss rods and transmission driving dogs, made of Vanadium steel.

"These parts are all subjected to very severe stresses", states The Four Wheel Drive Auto Co., "consequently Vanadium Steel is an ideal material to meet these requirements.

"If we were to make these highly stressed parts of plain carbon steel, it would mean a great increase in weight of each part, which would increase the weight of the car and naturally decrease its efficiency in the same ratio".

In railroad forgings and castings—wherever steels are subjected to extremes in severity of service—Vanadium Steels are proving their greater strength, toughness and shock resistance. Are you interested in improved forgings or castings? Ask our metallurgists to assist you in the selection of better railroad steels.

VANADIUM CORPORATION OF AMERICA

NEW YORK
120 Broadway

DETROIT
Book Bldg.

VANADIUM STEELS

for Strength, Toughness and Durability



UNIVERSAL WELDED SLEEVES

—are forged, thus giving strength and ductility to the sleeve with consequent freedom from fracture.

—reduce stock balances, since three styles of sleeves are sufficient for any boiler requirement.

—will replace Threaded or Tapered Welded Sleeves, or Rigid Bolts, with little or no reaming of the outer boiler plate.

TAPERED WELDED SLEEVES

—are turned from bar stock, resulting in sleeves which frequently crack, due to brittleness of material.

—necessitate large stocks, since almost as many sizes of sleeves are required as with the Threaded type.

—can be used for replacement work, but in every case require extensive reaming of the outer sheet before installing the sleeve.

The Flannery Bolt Company invented the Tapered Welded Sleeve some ten years ago, and patented same. However, the design was not exploited to the railroads at that time because of certain economical and mechanical defects, a few of which are listed above.

The Flannery Bolt Company continued experimenting with the welded sleeve and finally in 1919, developed the Universal Type, introducing it to the railroad world that year and obtaining patent for same in 1920.

In spite of the fact, however, that this Company holds the patent for the Tapered Type of Welded Sleeve, imitations, that contain the very defects that prevented the Flannery Bolt Company from recommending this sleeve, are being offered to the railroads today. The Flannery Bolt Company has brought suit in the Federal Courts to stop these imitations, which, you will note, sprang up over five years after this Company had designed the Tapered Welded Sleeve.

We will furnish Tapered Welded Sleeves if the railroads insist, in spite of the acknowledged inferiority of the Type to our standard Universal Sleeve, just as we furnish Rigid Bolts if the railroads demand them instead of Flexible Bolts.

FLANNERY BOLT CO.
FLANNERY BLDG. PITTSBURGH, PA.

MORGAN



ONE OF THE ERECTING ROOMS IN LOCOMOTIVE SHOP 95' 0" x 900' 0"

Showing 58 Locomotives stripped and in process of repair. We have had 91 locomotives stripped in this building and in process of repair at one time.

MORE THAN 400 LOCOMOTIVES REBUILT

It is with a great deal of satisfaction that we look back over our achievement of the past three years of more than 400 locomotives successfully repaired and rebuilt.

The same highly skilled and successful organization which has made our loco-

motive repair service a success, is here to serve you.

Twelve of the leading Railroads and five industrial plants have profitably taken advantage of our service.

We welcome your inspection of our plant to see what our possibilities are for you.

The Morgan Engineering Co. Alliance, Ohio

Designers, Manufacturers and Contractors
Electric Traveling Cranes, Rolling Mill Machinery
Ordnance, Steel, Shipbuilding and Forging Plants Complete
Rock Crushers, Special Machinery for Any Purpose

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122 So. Michigan Ave.

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HUNT-SPILLER GUN IRON

Cylinder Packing

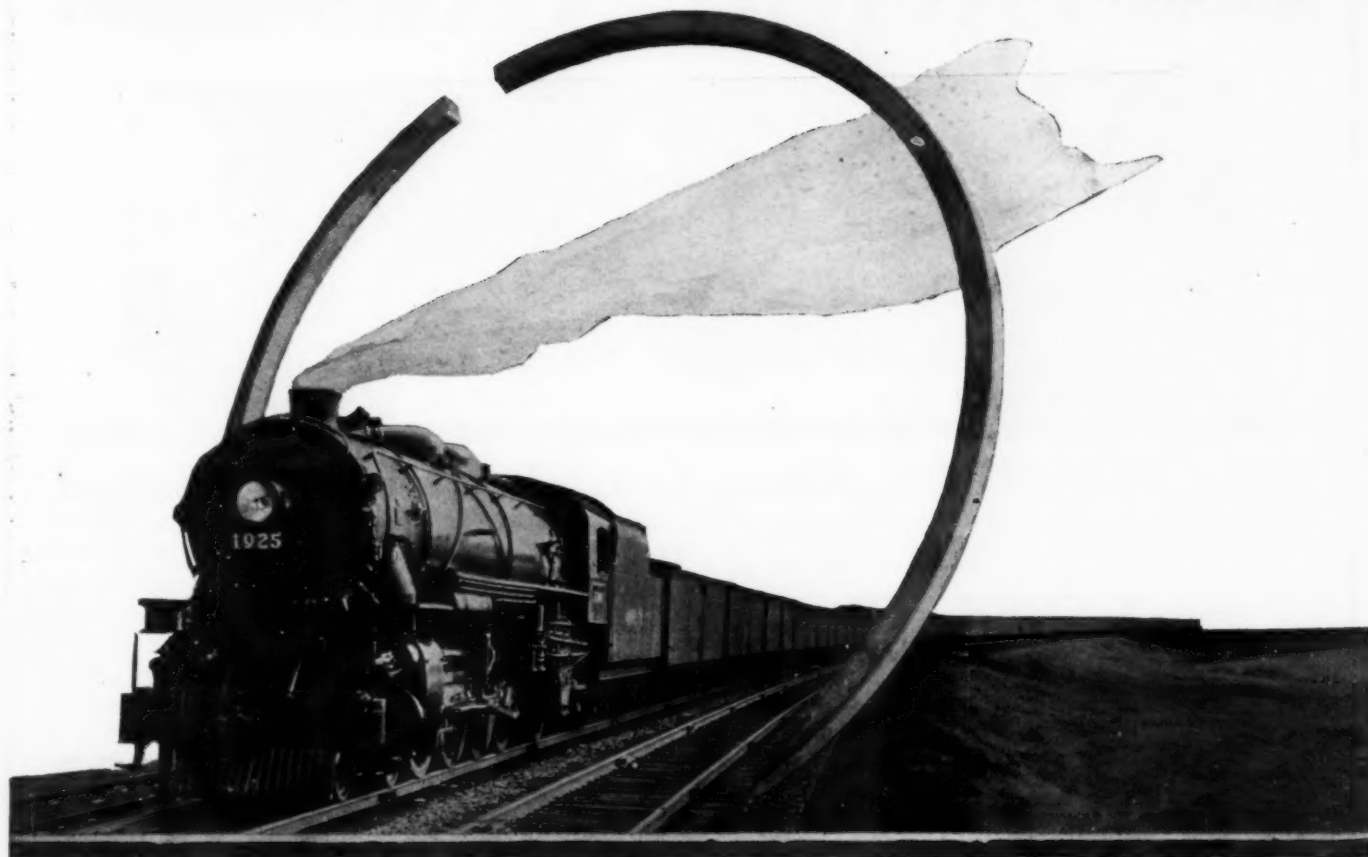
ROAD failures mean delayed schedules—Renewals are expensive and locomotives with defective cylinder packing are enormous coal wasters.

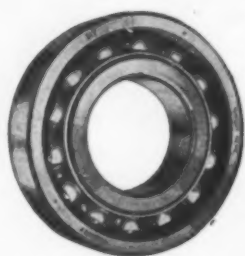
Over 85% of the leading railroads use only Hunt-Spiller Gun Iron Cylinder Packing. This unusual endorsement is your guarantee that no other material can equal its wear-resisting qualities.

Made only by

HUNT-SPILLER MFG. CORPORATION
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GURNEY BALL BEARINGS

Add Efficiency to Speed Reducers



Due to their ability to safely carry extremely heavy loads, Gurney Ball Bearings—Maximum Service-Maximum Capacity type—are better suited for use in speed reducers than are bearings of any other type. By using the largest number of balls of the largest possible size in uninterrupted raceways of the closest permissible race curvature, Gurney Maximum Service-Maximum Capacity bearings have higher load carrying capacities than other types, resulting in the maximum of safety, service and efficiency.

MARLIN-ROCKWELL CORP.
JAMESTOWN, N. Y.



18311

All-Steel **FREIGHT CARS** Composite

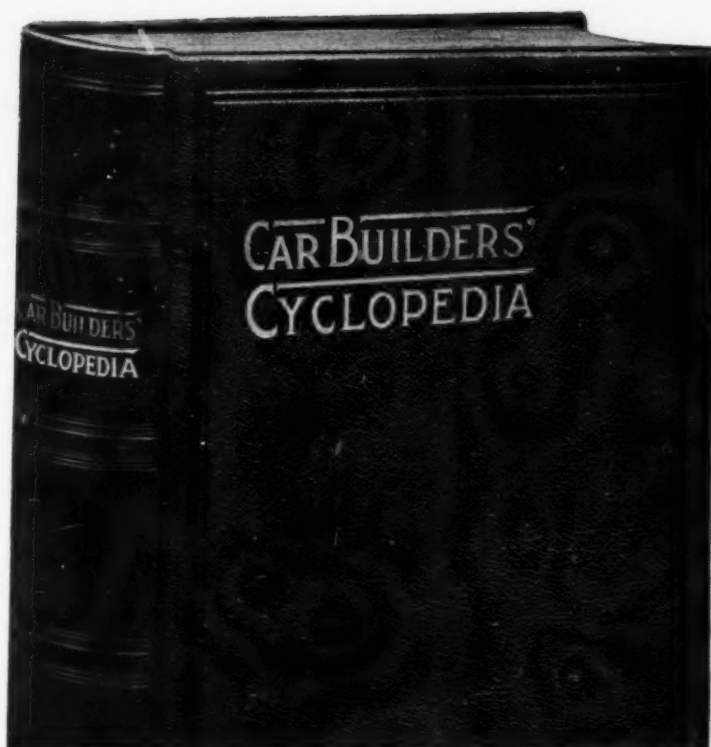


Box—Flat—Coke—Ore—Gondola—Hopper—Ballast

CAR PARTS
AXLES — FORGINGS — PRESSINGS
STEEL CASTINGS

Tennessee Coal, Iron & Railroad Company

General Offices: Brown-Marx Building, Birmingham, Alabama



In itself a library of car information



1164 pages, more than 3,000 illustrations.

Size 9 x 12 inches. Leather, \$10; buckram, \$8.

QUANTITIES of literature have been published in catalog form, book form, and magazine form, on cars and car equipment. Every railroad man who is acquainted with this literature knows the difficulties of keeping it in shape and systematized for ready reference.

Many feel that there is no need to depend upon other sources while the "Car Builders' Cyclopedic" is in itself a library of car information which is up-to-date, indexed for instant application.

The 1925 edition covers all types of cars and car equipment. It includes A. R. A. specifications with latest revisions. Much new material has been added and all information is extensively illustrated. The only single volume which is equal to a shelf of other car literature. Sent for free examination upon receipt of the coupon.

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11 successive editions, in their turn, have served the railroads every day for forty-six years.

Simmons-Boardman Publishing Co.
Book Department,
30 Church Street, New York, N. Y.

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RA-6-27-25



**A Crane that is ready When You
Need it and Does what You
Want it to do**

You want a crane that will be ready for work at all times; a rugged, speedy, dependable machine that will stand the gaff and render versatile service — anything from plain hook work to driving piles. That's why the locomotive crane you really need is the "AMERICAN".



Saint Paul, Minn.

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**THE CANADIAN PACIFIC
RAILROAD ALONE USES 35
JORDANS — THE NEW YORK
CENTRAL LINES BOUGHT 9 IN
ONE YEAR.**

*America's best-maintained railroads
have Jordans. Catalog upon request.*

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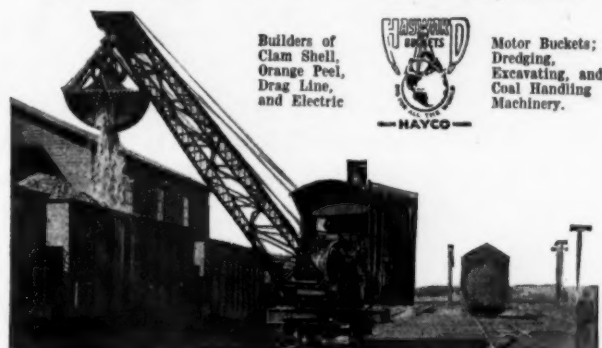
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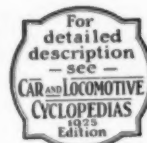


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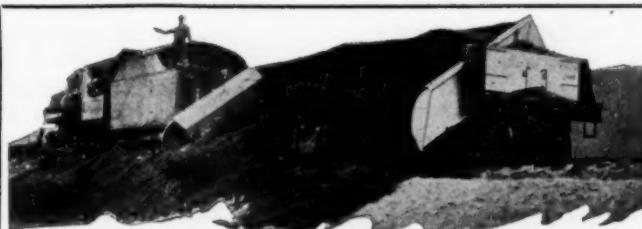
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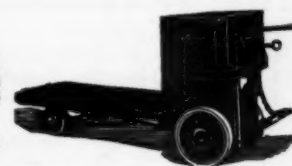
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Get Together Department

BUYERS INDEX

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.

<p>Acetylene. Dunham Co., Keith.</p> <p>Acetylene Cylinders. Dunham Co., Keith.</p> <p>Air Reservoir Joints — (See Joints, Air Reservoir).</p> <p>Alloy Steel. Central Steel Co.</p> <p>Angle Bars — (See Joints, Rail).</p> <p>Angles, Channels and Tees — (See Shapes, Structural).</p> <p>Arch, Locomotive Brick. American Arch Co.</p> <p>Arresters, Lightning. Electric Service Supplies Co. P. & M. Co., The</p> <p>Arresters, Loco. Spark. Mudge & Co.</p> <p>Ash Conveyors. Industrial Works. McMyler Interstate Co.</p> <p>Auxiliary Locomotive. Bethlehem Steel Co., Inc.</p> <p>Axles, Mine Car. Brill Company, J. G., The</p> <p>Axles, Car and Locomotive. American Locomotive Co. Baldwin Locomotive Works. Bethlehem Steel Co. Carnegie Steel Co. Illinois Steel Co. Johnson & Co., J. R. Lima Locomotive Works. Standard Steel Works Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Bars, Concrete Reinforcing. Carnegie Steel Co. Illinois Steel Co.</p> <p>Bars, Iron and Steel. Bethlehem Steel Co. Carnegie Steel Co. Central Steel Co. Falls Hollow Staybolt Co. Illinois Steel Co. Lockhart Iron & Steel Co. McConway & Torley Co. Ryerson & Son, Joseph T. Tennessee Coal, Iron & Railroad Co.</p> <p>Batteries, Lighting. Electric Storage Battery Co.</p> <p>Batteries, Starting. Electric Storage Battery Co.</p> <p>Batteries, Storage. Electric Storage Battery Co., The</p> <p>Batteries, Wet Cell. Electric Storage Battery Co., The</p> <p>Bearings, Axles, Motor and Push Car. Fairmont Railway Motors, Inc. Mudge & Co.</p> <p>Bearings, Ball. Marlin-Rockwell Corp.</p> <p>Bearings, Center. Brill Company, J. G., The Chicago Ry. Equipment Co. Miner, W. H. Pressed Steel Car Co. Symington Co., T. H. Woods & Co., Edwin S.</p> <p>Bearings, Journal. Keystone Bronze Co.</p> <p>Bearings, Roller Side. Q. & C. Co., The Standard Coupler Co.</p>	<p>Bearings, Side. American Steel Foundries. Chicago Railway Equipment Co. Fort Pitt Malleable Iron Co. Miner, W. H. Standard Car Truck Co. Wine Railway Appliance Co. Woods & Co., Edwin S.</p> <p>Bending and Straightening Machines. Ryerson & Son, Joseph T.</p> <p>Billets, Steel. Carnegie Steel Co. Central Steel Co. Illinois Steel Co. McConway & Torley Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Bins, Steel. Blaw-Knox Co.</p> <p>Blocks, Creosoted. American Creosoting Co. Central Coal & Coke Co. Century Wood Preserving Co. Colonial Creosoting Co. Georgia Creosoting Co. Gulf States Creosoting Co. International Creosoting & Constr. Co. Jennison Wright Co. Long-Bell Lumber Co., The Michigan Wood Preserving Co. New England Wood Preserving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.</p> <p>Blooms, Steel. Carnegie Steel Co. Central Steel Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Blower Fittings, Automatic Smokebox. Barco Mfg. Co.</p> <p>Blowers, Exhaust. Mudge & Co. Sturtevant Co., B. F.</p> <p>Blowers, Turbo. Sturtevant Co., B. F.</p> <p>Blow Off Line Joints, Round-house — (See Joints, Etc.).</p> <p>Boilers, Locomotive. American Locomotive Co. Baldwin Locomotive Works.</p> <p>Boilers, Scale Proof. Industrial Works.</p> <p>Boilers, Water Tube. Babcock & Wilcox.</p> <p>Bolsters, Steel. Bradford Corp. Brill Company, J. G., The Pressed Steel Car Co.</p> <p>Bolts and Nuts. Bethlehem Steel Co. Foster Co., L. B. Ryerson & Son, Joseph T.</p> <p>Bolts, Patch. Falls Hollow Staybolt Co.</p> <p>Bolts, Track. Bethlehem Steel Co. Illinois Steel Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Books, Railway. Gibson-Pribble Co. Simmons-Boardman Publishing Co.</p> <p>Boosters, Locomotive. Franklin Ry. Supply Co., Inc.</p>	<p>Booths, Telephone. Dickinson, Inc., Paul.</p> <p>Braces, Rail. Bethlehem Steel Co. Fort Pitt Malleable Iron Co. Q. & C. Co., The Ramapo Ajax Corp.</p> <p>Brake Beams. Bethlehem Steel Co. Bradford Corp. Brill Company, J. G., The Chicago Railway Equipment Co. Davis Brake Beam Co. Pressed Steel Car Co.</p> <p>Brake Beam—Supports. Chicago Railway Equipment Co. Davis Brake Beam Co.</p> <p>Brake Fittings, Pins, Levers, Etc. Brill Company, J. G., The Schaefer Equipment Co. Steel Car Forge Co.</p> <p>Brake Heads. American Steel Foundries. Chicago Railway Equip. Co.</p> <p>Brake Jaws. Schaefer Equipment Co. Steel Car Forge Co.</p> <p>Brake Shoes. American Brake Shoe & Fdy. Co. Brill Company, J. G., The Fort Pitt Malleable Iron Co. Railway Materials Co. Standard Brake Shoe & Foundry Co.</p> <p>Brakes, Air. Westinghouse Air Brake Co.</p> <p>Brakes, Electric. Westinghouse Air Brake Co.</p> <p>Brakes, Hand. Miner, W. H. Union Railway Equipment Co. Wine Railway Appliance Co.</p> <p>Brick Locomotive Arch. American Arch Co.</p> <p>Bridge and Crossing Plank. Creosoted. Century Wood Preserving Co. Michigan Wood Preserving Co. New England Wood Preserving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.</p> <p>Bridge Builders. Bethlehem Steel Co.</p> <p>Bridge Stringers — (See Stringers, Bridge).</p> <p>Buckets, Giam Shell. Blaw-Knox Co. Brown Hoisting Machy. Co. Hayward Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.</p> <p>Buckets, Drag Line. Hayward Co.</p> <p>Buckets, Electric Motor. Hayward Co.</p> <p>Buckets, Grab. American Bridge Co. American Hoist & Derrick Co. Blaw-Knox Co. Brown Hoisting Machy. Co. Hayward Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.</p>	<p>Buckets, Orange Peel. Hayward Co.</p> <p>Buffers, Friction. Miner, W. H. Standard Coupler Co. Westinghouse Air Brake Co.</p> <p>Buffers, Radial. Franklin Railway Supply Co., Inc.</p> <p>Building Materials. Johns Manville, Inc.</p> <p>Buildings, Iron, Steel and Steel Concrete. Blaw-Knox Co. McClellan & Junkersfeld, Inc. Robinson Co., Dwight P.</p> <p>Buildings, Portable Steel. Blaw-Knox Co.</p> <p>Buildings, Steel. American Bridge Co.</p> <p>Bulkheads, All Steel. Equipment Specialties Co.</p> <p>Bulldozers. Ryerson & Son, Joseph T.</p> <p>Cable Accessories, Electrical. Electric Service Supplies Co.</p> <p>Cables, Electric. American Steel & Wire Co. General Electric Co. Kerite Insulated Wire & Cable Co. Okonite Co., The</p> <p>Cableways — (See Tramways).</p> <p>Car Lighting Equipment — (See Lighting Car Equipment).</p> <p>Carlines. Hutchins Car Bfg. Co.</p> <p>Car Lighting Equipment. Electric Storage Battery Co., The</p> <p>Car Material, Wood. Exchange Sawmills Sales Co. Louisiana Red Cypress Co. Stephens Lumber Co.</p> <p>Car Parts, Freight. Pressed Steel Car Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Car Parts and Appliances. Pressed Steel Car Co.</p> <p>Car Parts, Second-Hand. Briggs & Turivas.</p> <p>Car Repairs. Pressed Steel Car Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Car Retarding Systems. General Railway Signal Co.</p> <p>Car Steps, Safety. Morton Mfg. Co.</p> <p>Cars, Auto, Gas & Electric. Autocar Company, The</p> <p>Cars, Ballast. Bethlehem Steel Co.</p> <p>Cars, Dump. Bethlehem Steel Co. Case Crane & Engineering Co., The Clark Car Co. Differential Steel Car Co. McMyler Interstate Co. Pressed Steel Car Co. Western Wheeled Scraper Co.</p> <p>Cars, Freight. Bethlehem Steel Co. Pressed Steel Car Co. Tennessee Coal, Iron & Railroad Co.</p> <p>Cars, Freight (New and Repaired). Pressed Steel Car Co.</p>	<p>Cars, Gasoline Motor. Brill Company, J. G., The</p> <p>Cars, Hand and Push. Fairmont Railway Motors, Inc. Mudge & Co.</p> <p>Cars, Industrial. Bethlehem Steel Co. Brill Company, J. G., The Case Crane & Engineering Co., The Foster Co., L. B. Pressed Steel Car Co.</p> <p>Cars, Motor (Inspection). Fairmont Railway Motors, Inc. Mudge & Co.</p> <p>Cars, Motor (Section). Fairmont Railway Motors, Inc. Mudge & Co.</p> <p>Cars, Motor (Weed Mower). Mudge & Co.</p> <p>Cars, Ore. Brill Company, J. G., The Clark Car Co. Pressed Steel Car Co.</p> <p>Cars, Passenger. Brill Company, J. G., The Pressed Steel Car Co.</p> <p>Cars, Rebuilt and Repaired. Pressed Steel Car Co.</p> <p>Cars, Second Hand. Briggs & Turivas. Pressed Steel Car Co.</p> <p>Cars, Self-Propelled Passenger. Brill Company, J. G., The</p> <p>Cars, Shaped, Pressed Steel. Morton Mfg. Co.</p> <p>Cars, Spreader. Jordan Company, O. F.</p> <p>Cars, Tank. Bethlehem Steel Co. Pressed Steel Car Co.</p> <p>Cars, Trailer. Mudge & Co.</p> <p>Castings, Brass and Bronze. Keystone Bronze Co.</p> <p>Castings, Gray Iron. American Brake Shoe & Fdy. Co. American Locomotive Co. Baldwin Locomotive Works. Ramapo Ajax Corp. Standard Brake Shoe & Foundry Co.</p> <p>Castings Gun Iron. Ramapo Ajax Corp. Hunt Spiller Mfg. Corp.</p> <p>Castings, Malleable Iron. American Malleable Castings Association. Chicago Railway Equipment Co.</p> <p>Fort Pitt Malleable Iron Co. P. & M. Co., The Pressed Steel Car Co.</p> <p>Castings, Steel. American Locomotive Co. American Steel Foundries. Bethlehem Steel Co. Commonwealth Steel Co. Edgewater Steel Co. McConway & Torley Co. Pressed Steel Car Co. Standard Brake Shoe & Foundry Co. Standard Steel Works Co. Tennessee Coal, Iron & Railroad Co. Union Spring & Mfg. Co. Union Steel Casting Co.</p>
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For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

Castings, Steel Vanadium. Union Steel Casting Co.	Cranes, Gantry. Brown Hoisting Mch. Co. Industrial Works. Morgan Engineering Co. Orton & Steinbrenner Co.	Devices, Safety, Motor Car. Fairmont Railway Motors, Inc. Mudge & Co.	Engineers, Consulting, Civil, Elec., Hydraulic, Mech., Val. Battey & Kipp. Day & Zimmerman, Inc. Hunt Co., Robert W. Muhlfield, John E. Smith & Co., C. E.	Flue Cleaners—(See Cleaners, Flue).
Cement, Car Roofing. Lucas Co., Robt. M.	Cranes, Jib. Brown Hoisting Mch. Co. Industrial Works. McMyler Interstate Co. Morgan Engineering Co.	Diaphragms for Cars, Canvas and Steel. Morton Mfg. Co.	Engineers, Contracting. Battey & Kipp. Hunt Co., Robert W. McClelland & Junkersfeld. Muhlfield, John E. Smith & Co., C. E.	Flue Cutters—(See Cutters, Flue).
Cement, High Temperature. Johns-Manville, Inc.	Cranes, Locomotive. Brown Hoisting Mch. Co. Industrial Works. McMyler Interstate Co. Morgan Engineering Co.	Diaphragms, Buffing Mechan- ism. Morton Mfg. Co.	Engineers, Inspecting. Hunt Co., Robert W. Muhlfield, John E. Smith & Co., C. E.	Flues, Boiler—(See Tubes, Boiler).
Cement Tile. Federal Cement Tile Co.	Cranes, Portable. American Hoist & Derrick Co. Brown Hoisting Mch. Co. Elwell Parker Electric Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.	Ditching Machinery. American Hoist & Derrick Co. Industrial Works. Jordon Company, O. F. Orton & Steinbrenner Co.	Engines, Crude and Fuel Oil. Worthington Pump & Mch. Corp.	Forges, Rivet Heating. Ryerson & Son, Joseph T.
Center Plates—(See Bearings, Center).	Cranes, Tractor. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.	Door Fixtures—(See Fixtures, Car Door).	Engines, Gas and Gasoline. Mudge & Co. Sturtevant Co., B. F. Worthington Pump & Mch. Corp.	Forging Presses. Morgan Engineering Co.
Center Sills. Bradford Corp.	Cranes, Wharf. Industrial Works.	Door, Locomotive, Fire-Box. Franklin Railway Supply Co., Inc.	Engines, Hoisting. American Hoist & Derrick Co. Brown Hoisting Mch. Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.	Forgings. Bethlehem Steel Co. Brill Company, J. G., The Carnegie Steel Co. Edgewater Steel Co. General Ry. Signal Co. Illinois Steel Co. Johnson & Co., J. R. McMyler Interstate Co. Pressed Steel Car Co. Steel Car Forge Co. Tennessee Coal, Iron & Railroad Co.
Chemists. Hunt Co., Robt. W.	Crosses. American Crossotting Co. Century Wood Preserving Co. Colonial Crossotting Co. Georgia Crossotting Co. International Crossotting & Construction Co. Michigan Wood Preserving Co. New England Wood Pre- serving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.	Doors, Car. Miner, W. H. Union Railway Equipment Co. Wine Railway Appliance Co.	Expanders, Tube. Ryerson & Son, Joseph T.	Forgings, Drop. Brill Company, J. G., The General Ry. Signal Co. Steel Car Forge Co.
Chimneys, Cast Iron. Dickinson, Inc., Paul.	Crossed Lumber. American Crossotting Co., Inc., The. International Crossotting & Construction Co.	Doors, Grain. Exchange Sawmills Sales Co.	Fans, Exhaust and Ventil- ating. Mudge & Co. Sturtevant Co., B. F.	Forms, Steel, for Concrete Construction. Blaw-Knox Co.
Cinder Handling Plants. Roberts & Schaefer Co.	Crossings — (See Frogs and Crossings).	Doors, Steel. Morton Mfg. Co.	Fasteners, Car Door. Fort Pitt Malleable Iron Co. Miner, W. H.	Foundations. Smith & Co., C. E.
Clamps, Flanging. Ryerson & Son, Joseph T.	Crossheads and Shoes. Barco Mfg. Co.	Draft Arms. Bradford Corp.	Ferro Molybdenum. Vanadium Corp. of America.	Foundry Sand Handling Equip- ment. Hayward & Co.
Clamps, Guard Rail. Q. & C. Co., The.	Cross-Ties. Century Wood Preserving Co. Louisiana Red Cypress Co. Michigan Wood Preserving Co. New England Wood Pre- serving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co. Stephens Lumber Co.	Draft Gears. Bradford Corp. Fort Pitt Malleable Iron Co. Miner, W. H. Standard Coupler Co. Symington Co., T. H. Union Draft Gear Co. Walker Draft Gear Corp. Westinghouse Air Brake Co.	Fencing, Wire — (See Wire Fence).	Frames, Locomotive. American Locomotive Co. American Steel Foundries. Baldwin Locomotive Works. Union Steel Casting Co.
Clamps, Hose. Westinghouse Air Brake Co.	Crushers, Coal. Brown Hoisting Mch. Co. Orton & Steinbrenner Co. Worthington Pump & Mch. Corp.	Draft Yokes. Miner, W. H. Steel Car Forge Co.	Ferro Vanadium. Vanadium Corp. of America.	Frames, Safety Motor Car. Fairmont Railway Motors, Inc.
Clamps, Pipe. Franklin Ry. Supply Co., Inc.	Culverts. American Rolling Mill Co., The	Draw Bars, Unit Safety. Franklin Railway Supply Co., Inc.	Ferro Tungsten. Vanadium Corp. of America.	Frames, Truck. American Locomotive Co. American Steel Foundries. Baldwin Locomotive Works. Brill Company, J. G., The Franklin Railway Supply Co., Inc. Pressed Steel Car Co.
Cleaners, Flue. Ryerson & Son, Joseph T.	Curtains and Fixtures, Car Vestibule. Morton Mfg. Co.	Drawbar Centering Device. Miner, W. H. Union Railway Equipment Co.	Filters, Water and Industrial. American Water Softener Co.	Frames, Vanadium. American Locomotive Co. Baldwin Locomotive Works. Union Steel Casting Co.
Closets, Water. Duner Co.	Curtains and Fixtures, Car Window. Morton Mfg. Co.	Drilling Machinery. Hayward Co. Industrial Works.	Filters, Water. Glessel Co., Henry. Reisert Automatic Water Purifying Co.	Frogs and Crossings. Bethlehem Steel Co. Foster Co., L. B. Ramapo Ajax Corp.
Coach and Coach Yard Steam Joints—(See Joints, Etc.).	Cushions, Loco. Mudge & Co.	Drilling Machines, Rock. General Electric Co.	Filtration Plants, Water. American Water Softener Co.	Fulcrums, Brake Beam. Brill Company, J. G., The Chicago Ry. Equipment Co.
Coal, Ore and Ash Handling Machines. Brown Hoisting Machinery Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co. Roberts & Schaefer Co.	Cushions, Motor Car. Mudge & Co.	Drills, Track & Bonding. Bird-Archer Company, The	Reisert Automatic Water Purifying Co.	Furnaces, Rivet Heating—(See Forges, Rivet Heating).
Coaling Stations. Roberts & Schaefer Co.	Cutters, Flue. Ryerson & Son, Joseph T.	Drinking Fountains. Glessel Co., Henry.	Fireboxes. American Locomotive Co. Baldwin Locomotive Works.	Gage Testers — (See Testers, Gage).
Cocks, Angle. Westinghouse Air Brake Co.	Cyclopedias, Railway. Simmons-Boardman Publish- ing Co.	Driving Boxes (Extended Main). Franklin Railway Supply Co.	Fittings, Air Brake. Westinghouse Air Brake Co.	Gages, Steam. Ashton Valve Co.
Compounds, Boiler. Bird-Archer Company, The Paige & Jones Chemical Co.	Derricks. Carnegie Steel Co. Industrial Works. McMyler Interstate Co. Morgan Engineering Co.	Drop Door Mechanism. Wine Railway Appliance Co.	Fixtures, Car Door. Miner, W. H. Union Railway Equipment Co.	Gages, Wheel Press Record- ing. Ashton Valve Co.
Compressors, Air. Worthington Pump & Mch. Corp.	Dials. Q. & C. Co., The.	Dynes — (See Generators, Electric, Economizers, Fuel).	Foundry Supplies. Bird-Archer Company, The	Gates, Tail. Morton Mfg. Co.
Concrete Floor Slabs. Federal Cement Tile Co.	Derricks, Hand and Steel. Hayward Co.	Economizers, Fuel. Sturtevant Co., B. F.	Flangers, Snow. Q. & C. Co., The.	Gear Blanks, Rolled Steel. Standard Steel Works Co.
Concrete Reinforcing. American Steel & Wire Co.		Electrical Supplies. Electric Service Supplies Co.	Floodlights. Electric Service Supplies Co. Tuco Products Corp.	Gears and Pinions. American Steel Foundries.
Concrete Roofing, Tile. Federal Cement Tile Co.		Electrification, Railroad. Battey & Kipp. McClelland & Junkersfeld. Robinson Co., Dwight P. Smith & Co., C. E.	Fluorine. Johns Manville, Inc.	Gears, Valve — (See Valve Gears).
Condensing Apparatus. Worthington Pump & Ma- chinery Corp.		Ends, Steel. Hutchins Car Roofing Co. Union Metal Products Co.	Flooring, Composition. Johns Manville, Inc.	Generators, Car Lighting. Safety Car Lighting & Heating Co.
Conduits, Metallic Flexible. Barco Mfg. Co.		Engineers and Contractors. Battey & Kipp. Day & Zimmerman, Inc. Roberts & Schaefer Co. Robinson Co., Dwight P.	Flooring, Steel. Morton Mfg. Co.	Generators, Electric. Electric Service Supplies Co.
Connections, Truck Lever. Schaefer Equipment Co.		Engineers, Construction. Battey & Kipp. Day & Zimmerman, Inc. McClelland & Junkersfeld. Roberts & Schaefer Co. Robinson Co., Dwight P.	Flooring, Wood. Century Wood Preserving Co. Jennison Wright Co. Long-Bell Lumber Co., The Michigan Wood Preserving Co. New England Wood Pre- serving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.	Glass, Wire. Mississippi Wire Glass Co.
Connectors, Automatic T. F.— (See Train Pipe Con- nectors, Automatic).			Floors, Wood Block — (See also Blocks, Crossotting).	Graphite, Lubricating. Franklin Ry. Oil Co. Galena Signal Oil Co.
Connectors, Electrical. Electric Service Supplies Co.				Grapples, Wood. Hayward Co.
Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.)				Industrial Works.
Conveying Machinery. Brown Hoisting Mch. Co. Hayward Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co. Sturtevant Co., B. F.				Grate Shakers, Automatic. Franklin Railway Supply Co., Inc.
Couplers. Franklin Railway Supply Co., Inc. McConway & Torley Co. Standard Coupler Co. Westinghouse Air Brake Co.				Grease Forming Machines. Franklin Railway Supply Co., Inc.
Coupler Pockets—(See Draft Yokes).				
Couplings, Hose. Fort Pitt Malleable Iron Co. Gold Car Htg. & Ltg. Co. Westinghouse Air Brake Co.				
Covering, Seat Rattan. Hale & Kilburn Co.				
Cranes, Barge. Industrial Works.				
Cranes, Electric Traveling. Brown Hoisting Mch. Co. Case Crane & Engineering Co., The. Industrial Works. McMyler Interstate Co. Morgan Engineering Co.				

BUYERS INDEX

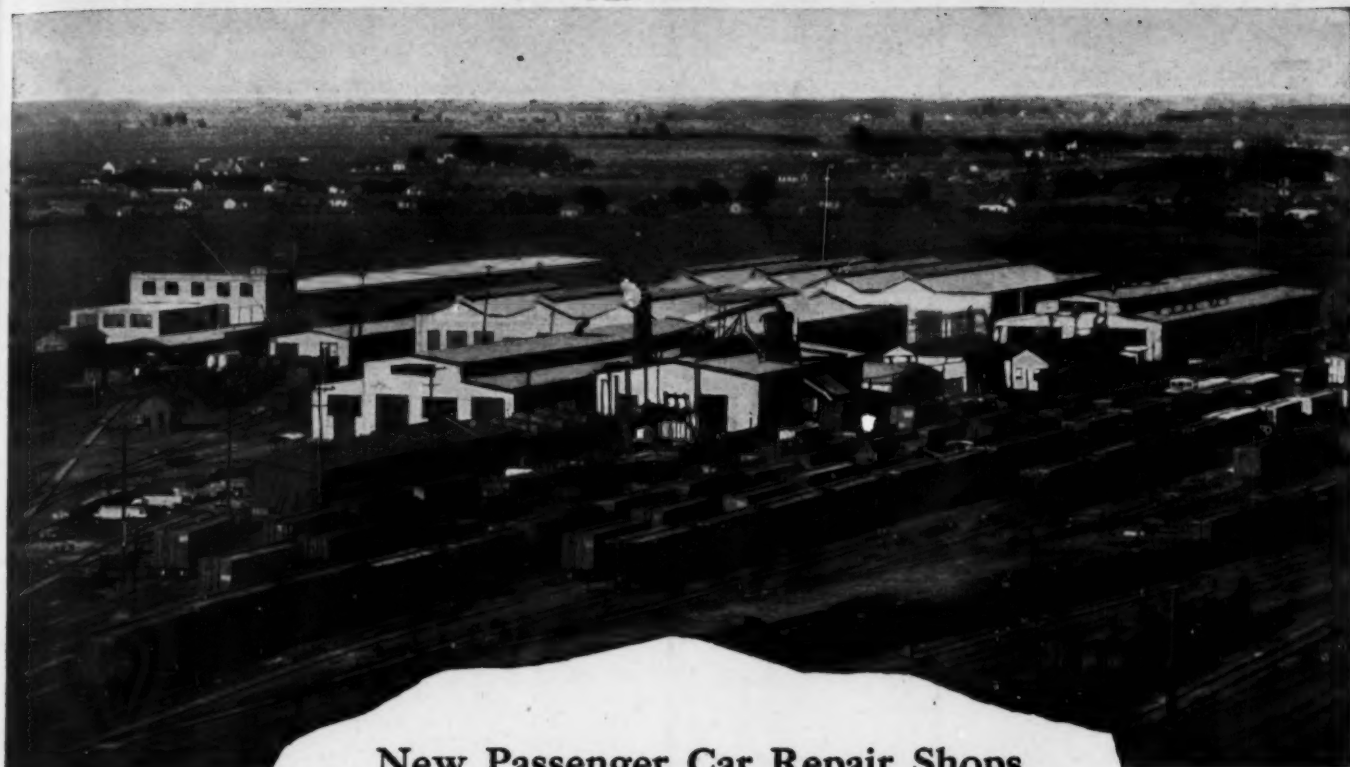
For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

Guard Rail (One Piece). American Chain Co. Bethlehem Steel Co. Ramapo Ajax Co.	Iron, Refined. Falls Hollow Staybolt Co. Ryerson & Son, Joseph T.	Locomotives, Second Hand. Briggs & Turivas.	Piling, Creosoted. American Creosoting Co. Century Wood Preserving Co.	Power Plants. McClelland & Junkersfeld, Inc.
Guards, Cattle. American Bridge Co.	Iron Staybolt—(See also Staybolts). Bethlehem Steel Co. Falls Hollow Staybolt Co. Lockhart Iron & Steel Co. Ryerson & Son, Joseph T.	Locomotives, Steam. American Locomotive Co. Baldwin Locomotive Works. Lima Locomotive Works.	Colonial Creosoting Co. Georgia Creosoting Co. International Creosoting & Constr. Co. Jennison Wright Co. Michigan Wood Preserving Co.	Muhlfeld, John E.
Guards, Dust. Symington Co., The	Jacks, Lifting. Buckeye Jack Mfg. Co. Dickinson, Inc., Paul.	Lubricants (Oil and Grease). Franklin Ry. Oil Co. Galena Signal Oil Co.	New England Wood Preserving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.	Preservatives, Wood. Century Wood Preserving Co. Jennison Wright Co. Michigan Wood Preserving Co.
Guards, Incandescent Lamp. Electric Service Supplies Co.	Jacks, Smokes. Johns-Manville, Inc.	Lubricators, Driving Box. Franklin Railway Supply Co., Inc.	Piling, Sheet Steel. Bethlehem Steel Co. Carnegie Steel Co.	New England Wood Preserving Co. Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.
Hair Felt. Johns-Manville, Inc.	Joints, Air Reservoir. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lubricators, Piston Rods. Q. & C. Co., The	Pins, Air Brake and Clevis. Champion Rivet Co. Steel Car Forge Co.	Pressed Steel Repair Parts. Pressed Steel Car Co. Tennessee Coal, Iron & Railroad Co.
Hammers, Steam. Industrial Works. Morgan Engineering Co. Ryerson & Son, Joseph T.	Joints, Blow Off Line (Round-house). Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lumber. American Creosoting Co., Inc., The Central Coal & Coke Co. Colonial Creosoting Co. Georgia Creosoting Co. Exchange Sawmills Sales Co.	Pins, Center. Miner, W. H.	Pulverizers, Coal—(See Crushers, Coal).
Hand Brakes—(See Brakes, Hand).	Joints, Coach and Coach Yard. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Jennison Wright Co. Long-Bell Lumber Co., The Louisiana Red Cypress Co. Stephens Lumber Co.	Pins, Coupler Knuckle. Champion Rivet Co. McConway & Torley Co. Steel Car Forge Co.	Pumps and Pumping Machinery. Worthington Pump & Mch. Corp.
Hangers, Car Door—(See Fixtures, Car Door). Ryerson & Son, Joseph T.	Joints, Flexible. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Lumber Asbestos. Johns-Manville, Inc.	Pipe, Cast Iron. Cast Iron Pipe Publicity Bureau.	Punching and Shearing Machines. Ryerson & Son, Joseph T.
Hatchways, Beveled. Equipment Specialties Co.	Joints, Rail. Carnegie Steel Co. Illinois Steel Co. Q. & C. Co., The Rail Joint Co.	Lumber, Creosoted. Century Wood Preserving Co.	Pipe Covering. Johns-Manville, Inc.	Pushers, Locomotive Coal. Locomotive Stoker Co.
Headlight Reflectors and Cases. Electric Service Supplies Co.	Joints, Steam, Air and Liquid. Barco Mfg. Co. Franklin Ry. Supply Co., Inc.	Gulf States Creosoting Co. Michigan Wood Preserving Co.	Pipe Fittings—(See Fittings, Pipe).	Rail Anchors. P. & M. Co., The
Headlight Repair Parts, Electric. Electric Service Supplies Co.	Journal Box Packing. Little Co., Dexter P.	New England Wood Preserving Co.	Pipe, Metal Culvert. American Sheet & Tin Plate Co.	Rail Benders. Q. & C. Co., The
Headlights, Electric. Electric Service Supplies Co.	Journal Boxes and Lids. Allegheny Steel Co. American Steel Foundries. Brill Company, J. G., The Hunt-Spiller Mfg. Corp. Railway Steel Spring Co. Symington Co., T. H. Union Spring & Mfg. Co.	Ohio Wood Preserving Co. Pittsburgh Wood Preserving Co.	Pipes, Cast Iron. Cast Iron Pipe Publicity Bureau.	Rail Bonds. American Steel & Wire Co. Rail Braces—(See Braces, Rail).
Heaters, Electric & Ltg. Gold Car Htg. & Ltg. Co.	Keys, Brake Shoe. Bradford Corp. Steel Car Forge Co.	Magnets, Lifting. Industrial Works.	Pipe Covering. Johns-Manville, Inc.	Rail, Manganese. Electric Service Supplies Co. Manganese Steel Rail Co.
Heaters, Electric Rivet. American Hoist & Derrick Co.	Kilns, Dry. Sturtevant Co., B. F.	Mechanical Draft Apparatus—(See Heating and Vent. App.).	Pipe Fittings—(See Fittings, Pipe).	Railroad Structures—(See Engineers and Contractors, also Buildings).
Heaters, Feed Water. Worthington Pump & Mch. Corp.	Knuckles, Emergency. Q. & C. Co., The Laboratories, Testing. Hunt Co., Robert W.	Melters, Electric, Snow. Q. & C. Co., The	Pipe, Metal Culvert. American Sheet & Tin Plate Co.	Rails. Bethlehem Steel Co. Carnegie Steel Co. Foster Co., L. B. Illinois Steel Co. Tennessee Coal, Iron & Railroad Co.
Heating and Ventilating Apparatus. Sturtevant Co., B. F. Vapor Car Heating Co., Inc.	Ladders, Steel Car. Union Railway Equipment Co.	Milling Machines, Plain and Universal. Ryerson & Son, Joseph T.	Pipes, Boiler, Firebox—(See Steel Firebox).	Rails, Relaying. Briggs & Turivas. Foster Co., L. B.
Heating Systems, Car (Electric and Steam). Gold Car Htg. & Ltg. Co. Safety Car Heating Co., Inc.	Lamps, Incandescent. Electric Service Supplies Co.	Motors, Water and Oil. Worthington Pump & Machinery Corp.	Plates, Center—(See Bearings, Center).	Rail Splice Plates—(See Joints, Rail).
Vapor Car Heating Co., Inc.	Lathes, Engine. Ryerson & Son, Joseph T.	Mixing Machines, Concrete. Blaw-Knox Co.	Plates, Follower. Steel Car Forge Co.	Rattans. Haile-Kilburn Co.
Wine Railway Appliance Co.	Lath, Metal. American Rolling Mill Co., The	Motors, Electric. Sturtevant Co., B. F. Westinghouse Elec. & Mfg. Co.	Plates, Iron and Steel. American Rolling Mill Co., The	Reflectors, Headlight. Electric Service Supplies Co.
Heating Units, Independent. Sturtevant Co., B. F.	Lighting Equipment, Car. Electric Storage Battery Co., The	Nails. American Steel & Wire Co.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Refrigerator Car Equipment. Union Railway Equipment Co.
Hoisting Machinery. Brown Hoisting Mch. Co. Industrial Works. McMyler Interstate Co. Orton & Steinbrenner Co.	Lino Material. Electric Service Supplies Co.	New Kilns, Dry. Sturtevant Co., B. F.	Platforms, Car. Standard Coupler Co.	Refrigerator Car Equipment. Union Railway Equipment Co.
Holists, Chain. Ryerson & Son, Joseph T.	Locomotive Repairs. Morgan Engineering Co.	Nozzles, Exhaust. Franklin Railway Supply Co., Inc.	Flows, Snow. American Locomotive Co.	Wine Railway Appliance Co.
Holists, Electric. American Hoist & Derrick Co.	Locomotives, Contractors. American Locomotive Co.	Nuts—(See Bolts and Nuts).	Plates, Tie. Bethlehem Steel Co.	Replacers, Car. Q. & C. Co., The
Brown Hoisting Mch. Co.	Locomotives, Electric. Baldwin Locomotive Works.	Oil Filtering and Storage Systems. American Water Softener Co.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Reverse Gear, Power. Barco Mfg. Co.
Holders, Angle Cook. Mudge & Co.	Locomotives, Gasoline. Baldwin Locomotive Works.	Oil Plugs, Steam Chest. Franklin Railway Supply Co., Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Franklin Railway Supply Co., Inc.
Heppers, Wet and Dry (Car). Duner Co.	Locomotives, Industrial. American Locomotive Co.	Oils, Lubricating. Franklin Ry. Oil Co.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Rivets. Champion Rivet Co.
Hose, Air, Steam, Etc. Westinghouse Air Brake Co.	Locomotives, Mine. Baldwin Locomotive Works.	Oxygen. Dunham Co., Keith.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Pressed Steel Car Co.
Ice Grates. Equipment Specialties Co.	Locomotives, Rebuilt. Morgan Engineering Co.	Oxygen Plants. Dunham Co., Keith.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Ryerson & Son, Joseph T.
Ingot. Edgewater Steel Co.	Locomotive Repair Parts. American Locomotive Co.	Packing, Cylinder & Valve Ring. Hunt-Spiller Mfg. Corp.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Roller Bearings—(See Bearings, Roller).
Illinois Steel Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Roofing Asbestos. Johns-Manville, Inc.
McConway & Torley Co.	Locomotives, Second Hand. Briggs & Turivas.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Roofing, Buildings. American Rolling Mill Co., The
Inspection of Material and Equipment—(See Engineers, Inspection).	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Roofing, Corrugated. American Rolling Mill Co., The
Insulation, Car. Lehon Co., The	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Johns-Manville, Inc.
Insulation, Electrical. Electric Service Supplies Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Roofing, Wood. Exchange Sawmills Sales Co.
Johns-Manville, Inc.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Rope, Wire—(See Wire Rope)
Insulation, Heat. Johns-Manville, Inc.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Running Boards, Car. Standard Ry. Equipment Co.
Iron Chain. Falls Hollow Staybolt Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Saddles, Running Board. Miner, W. H.
Iron, Charcoal. Falls Hollow Staybolt Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	Sand Drying Plants. Roberts & Schaefer Co.
Parkeburg Iron Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	
Iron, Hollow Staybolt Bars. Falls Hollow Staybolt Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	
Iron, Pig. Bethlehem Steel Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	
Illinois Steel Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	
Lockhart Iron & Steel Co.	Locomotives, Steam. Baldwin Locomotive Works.	Packing, Locomotive Cab Cock. Johns-Manville, Inc.	Plates, Tin and Tarn. American Sheet & Tin Plate Co.	

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

- Saws, High Speed Friction.
Ryerson & Son, Joseph T.
- Saws, Portable, Rail.
Industrial Works.
Q. & C. Co., The
- Scrap Iron.
Briggs & Turivas.
- Scrapers, Cable, Drag.
Hayward Co.
- Seats, Car.
Brill Company, J. G., The
Hale-Kilburn Co.
- Shafting.
Falls Hollow Staybolt Co.
Johnson & Co., J. R.
Ryerson & Son, Joseph T.
- Shapes, Pressed Steel.
Morton Mfg. Co.
Pressed Steel Car Co.
- Shapes, Structural.
Carnegie Steel Co.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & Railroad Co.
- Shapers.
Ryerson & Son, Joseph T.
Sheets, Black and Galvanized.
American Rolling Mill Co.
Ryerson & Son, Joseph T.
- Sheets, Corrugated.
American Rolling Mill Co.
- Sheets, Electrical.
American Rolling Mill Co., The
American Sheet & Tin Plate Co.
- Sheets, Locomotive Jacket.
American Rolling Mill Co.
American Sheet & Tin Plate Co.
- Sheets, Polished or Finished Iron.
Sheets, Steel.
American Rolling Mill Co., The
Bethlehem Steel Co.
Ryerson & Son, Joseph T.
Tennessee Coal, Iron & Railroad Co.
- Shovels, Gas.
Brown Hoisting Machinery Co.
Orton & Steinbrenner Co.
- Shops, Railroad—(See Buildings, Iron, Steel and Steel Concrete).
- Siding, Corrugated and Plain.
American Rolling Mill Co., The
Johns-Manville, Inc.
- Signal Accessories.
Electric Storage Battery Co., The
- Slabs, Concrete Floor.
Federal Cement Tile Co.
- Slabs, Concrete Roof.
Federal Cement Tile Co.
- Slabs, Steel.
Tennessee Coal, Iron & Railroad Co.
- Slag, Blast Furnace.
Carnegie Steel Co.
- Spikes.
American Steel & Wire Co.
Foster Co., L. B.
Illinois Steel Co.
Tennessee Coal, Iron & Railroad Co.
- Splice Bars, Angle.
Carnegie Steel Co.
Illinois Steel Co.
- Splice Bars, Rail.
Bethlehem Steel Co.
Foster Co., L. B.
- Spreaders.
Jordan Company, O. F.
- Spring Plates or Seats.
Allegheny Steel Co.
- Spring.
American Steel Foundries.
American Steel & Wire Co.
Fort Pitt Spring & Mfg. Co.
Pittsburgh Spring & Steel Co.
Railway Steel Spring Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.
- Spring, Machinery for Repairing.
Ryerson & Son, Joseph T.
- Spring, Vanadium Steel.
Pittsburgh Spring & Steel Co.
- Stacks, Steel.
American Bridge Co.
- Stands, Switch and Target.
Q. & C. Co., The.
- Staybolts.
American Locomotive Co.
Bethlehem Steel Co.
Falls Hollow Staybolt Co.
Flannery Bolt Co.
Ryerson & Son, Joseph T.
- Staybolts, Hollow.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.
- Steam Chests.
Franklin Railway Supply Co., Inc.
- Steam Shovels.
Orton & Steinbrenner.
- Steel, Alloy.
Bethlehem Steel Co.
Central Steel Co.
- Steel, Firebox.
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
- Steel, Heat Treated.
Bethlehem Steel Co.
- Steel Plate Construction.
Blaw-Knox Co.
- Steel, Pressed Specialties.
Hale-Kilburn Co.
- Steel, Structural.
Blaw-Knox Co.
Case Crane & Engineering Co., The.
Illinois Steel Co.
Ryerson & Son, Joseph T.
- Steel, Tool.
Illinois Steel Co.
Ryerson & Son, Joseph T.
Standard Stoker Co.
Tennessee Coal, Iron & Railroad Co.
- Step Joints.
Q. & C. Co., The.
- Steps, Car—(See Car Steps, Safety).
- Stokers, Locomotive.
Locomotive Stoker Co.
Standard Stoker Co.
- Stringers, Bridge.
Long-Bell Lumber Co., The.
- Stringers, Bridge, Creosoted.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
- Superheaters.
Babcock & Wilcox.
- Switch Boards.
Johns-Manville, Inc.
- Switches, Electric.
Electric Service Supplies Co.
- Switches and Switch Stands.
Bethlehem Steel Co.
Foster Co., L. B.
McMyler Interstate Co.
Ramapo Ajax Corp.
- Tanks, Air, Gas, Oil, etc.
American Locomotive Co.
Babcock & Wilcox.
- Tanks, Water.
American Locomotive Co.
Babcock & Wilcox.
- Tape, Insulation.
Johns-Manville, Inc.
Okonite Co., The.
- Tape, Staybolt.
Ryerson & Son, Joseph T.
- Terminals, Railroad.
McClelland & Junkersfeld, Inc.
Robinson Co., Dwight P.
- Testers, Gage.
Ashton Valve Co.
- Testers, Staybolt.
Flannery Bolt Co.
- Ties, Creosoted.
American Creosoting Co., Inc., The.
Century Wood Preserving Co.
Colonial Creosoting Co.
Georgia Creosoting Co.
International Creosoting & Construction Co.
Jennison Wright Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
- Ties, Wood.
American Creosoting Co., Inc., The.
Century Wood Preserving Co.
Exchange Sawmills Sales Co.
Louisiana Red Cypress Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
Stephens Lumber Co.
- Ties, Zinc Treated.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
- Tile, Cement Roofing.
Federal Cement Tile Co.
- Timber.
American Creosoting Co., Inc., The.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
Gulf States Creosoting Co.
International Creosoting & Construction Co.
Long-Bell Lumber Co.
Louisiana Red Cypress Co.
Stephens Lumber Co.
- Timber, Creosoted.
Century Wood Preserving Co.
Michigan Wood Preserving Co.
New England Wood Preserving Co.
Ohio Wood Preserving Co.
Pittsburgh Wood Preserving Co.
- Tires, Steel.
Edgewater Steel Co.
Railway Steel Spring Co.
Standards Steel Works Co.
- Tools, High Speed Steel.
Bird-Archer Company, The
- Tractors, Industrial.
Elwell Parker Electric Co.
- Tramways.
Blaw-Knox Co.
- Tramways (Wire Rope).
American Steel & Wire Co.
- Transfer Tables.
Brown Hoisting Mch. Co.
Industrial Works.
Nichols & Bros., Geo. P.
- Transmission Towers.
Blaw-Knox Co.
- Trap Doors and Fixtures.
Teco Products Corp.
- Traps, Steam.
Johns-Manville, Inc.
- Treads, Safety.
Morton Mfg. Co.
- Treatment Water—(See Water Softening and Purifying).
- Trucks, Auto Gas & Electric.
Autocar Company, The
- Truck Frames—(See Frames Truck).
- Trucks, Baggage.
Case Crane & Engineering Co., The.
- Trucks, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Brill Company, J. G., The
Franklin Railway Supply Co., Inc.
Pressed Steel Car Co.
Standard Car Truck Co.
- Trucks, Electric Storage Battery.
Elwell Parker Electric Co.
- Trucks, Industrial.
Elwell Parker Electric Co.
- Trucks, Trailer.
Brill Company, J. G., The
Commonwealth Steel Co.
Franklin Railway Supply Co., Inc.
- Tractors.
Elwell-Parker Electric Co., The.
- Tubes, Arch.
Parkesburg Iron Co.
- Tubes, Boiler.
Allegheny Steel Co.
Bethlehem Steel Co.
Detroit Seamless Steel Tubes Co.
Globe Steel Tubes Co.
Parkesburg Iron Co.
Ryerson & Son, Joseph T.
- Tubes, Boiler, Charcoal, Iron.
Bethlehem Steel Co.
Parkesburg Iron Co.
- Tubes, Stay.
Falls Hollow Staybolt Co.
- Tubing, Seamless Steel.
Detroit Seamless Steel Tubes Co.
Globe Steel Tubes Co.
- Tungsten, Metal.
Vanadium Corp. of America.
- Turbine Generators.
Sturtevant Co., B. F.
- Turbo Generators.
Electric Service Supplies Co.
Sturtevant Co., B. F.
- Turnbuckles.
Industrial Works.
- Turntable Tractors.
Nichols & Bros., Geo. P.
- Turntables.
Bethlehem Steel Co.
Edgewater Steel Co.
Foster Co., L. B.
McMyler Interstate Co.
- Uncoupling Device.
Hutchins Car Rfg. Co.
Union Railway Equipment Co.
- Underframes, Steel.
Brill Company, J. G., The
Pressed Steel Car Co.
Tennessee Coal, Iron & Railroad Co.
- Upholstery, Car.
Brill Company, J. G., The
Mass. Mohair Plush Co.
- Valves, Drifting.
Franklin Railway Supply Co., Inc.
- Valves, Piston.
Franklin Railway Supply Co., Inc.
- Valves, Pop, Safety and Relief.
Ashton Valve Co.
Westinghouse Air Brake Co.
- Valves, Throttle.
Bradford Corp.
- Ventilators, Car.
Gold Car Htg. & Ltg. Co.
Mudge & Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.
- Ventilators, Shop and Roundhouse.
Dickinson, Inc., Paul.
- Washers.
Wine Railway Appliance Co.
- Waste.
Lillie Co., Dexter P.
- Water Coolers.
Glessel Co., Henry.
- Waterproofing Materials.
Lehon Co., The.
Lewis Asphalt Engineering Corp.
- Water Purifying Materials and Compounds.
Bird-Archer Co., The
Paige & Jones Chemical Co.
- Water Softening and Purifying.
American Water Softener Co.
Bird-Archer Co., The
Reisert Automatic Water Purifying Co.
- Wedges, Automatic.
Franklin Ry. Supply Co., Inc.
- Wedges, Journal Box.
American Steel Foundries.
Pressed Steel Car Co.
Steel Car Forge Co.
- Welding Machines, Flue.
Ryerson & Son, Joseph T.
- Welding and Cutting Apparatus—(See Cutting and Welding Apparatus).
- Well Traps.
Equipment Specialties Co.
- Wheelbarrows.
Case Crane & Engineering Co., The.
- Wheel Centers, Driving.
American Locomotive Co.
Baldwin Locomotive Works.
Edgewater Steel Co.
Hunt-Spiller Mfg. Corp.
Standard Steel Works Co.
Union Steel Casting Co.
- Wheels, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.
Bethlehem Steel Co.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
Pressed Steel Car Co.
Railway Steel Spring Co.
Standard Steel Works Co.
- Wheels, Cast Iron.
Pressed Steel Car Co.
- Wheels, Hand, Push and Motor Car.
Fairmont Railway Motors, Inc.
Mudge & Co.
- Wheels, Mine Car.
Carnegie Steel Co.
Edgewater Steel Co.
- Wheels, Pressed Steel Motor Car.
Mudge & Co.
- Wheels, Steel and Steel Tired.
American Steel Foundries.
Carnegie Steel Co.
Edgewater Steel Co.
Illinois Steel Co.
- Whistles, Locomotive.
Ashton Valve Co.
General Electric Co.
Westinghouse Air Brake Co.
- Windows, Weatherproofing.
Morton Mfg. Co.
- Wire.
American Steel & Wire Co.
Kerite Insulated Wire & Cable.
- Wire, Barb.
American Steel & Wire Co.
- Wire, Fence.
American Steel & Wire Co.
- Wire, Insulated.
American Steel & Wire Co.
General Electric Co.
Kerite Insulated Wire & Cable.
Okonite Co., The.
- Wire, Rail Bond—(See Rail Bonds).
- Wire, Rope.
American Steel & Wire Co.
- Wire, Telephone and Telegraph.
American Steel & Wire Co.
- Wood, Creosoted.
Jennison Wright Co.
- Wood Preservative—(See Preservative Wood).
- Wrecking Cranes—(See Cranes, Wrecking).



New Passenger Car Repair Shops and Stores Buildings for Wabash Railway

Modern buildings erected in record time,
at Decatur, Ill., replace old structures
destroyed by fire

"To prepare plans and estimates for new buildings, remove the debris from the site of a disastrous fire, salvage all usable material and then erect a new brick and steel passenger car repair and paint shop on the location of the old buildings, in a period of 156 days, is an engineering accomplishment worthy of more than passing notice. This feat was performed by Dwight P. Robinson & Co., Inc., New York, in replacing the passenger car repair shops and stores buildings of the Wabash Railway, at Decatur, Ill., which were completely destroyed by fire late in February, 1924."

*Editorial from Railway
Review February 7, 1925*

This satisfactory work was accomplished by consulting with the staff of the Railway Company at every step from preliminary plans to completion of the shops.

DWIGHT P. ROBINSON & COMPANY

INCORPORATED

ENGINEERS AND CONSTRUCTORS

CHICAGO

MONTREAL

LOS ANGELES

NEW YORK

ATLANTA

PHILADELPHIA

RIO DE JANEIRO

They Save Time and Save Coal

Stopping trains to operate switches at passing sidings consumes time and wastes coal.

These stops take not less than 10 minutes time and burn up 800 to 1,400 pounds of coal.

The use of power switch machines for the *distant operation* of switches makes it possible to operate passing siding and other important main track switches from a telegraph, a block or an interlocking station located a mile or more from the switch, *without stopping the train*.

By eliminating these unnecessary stops, the saving in time and coal will in one year's time offset the cost of an installation of a power switch machine for distant operation.

Let us send you some interesting data on the distant operation of switches and the cost of a freight train hour.

UNION SWITCH & SIGNAL COMPANY
Swissvale, Pennsylvania

GENERAL RAILWAY SIGNAL COMPANY
Rochester, New York

HALL SWITCH & SIGNAL COMPANY
Garwood, New Jersey

